

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMGEN INC.,

Petitioner,

-vs-

ALEXION PHARMACEUTICALS, INC.,

Patent Owner.

Deposition of of ARTURO CASADEVALL, M.D., Ph.D.

New York, New York

Friday, January 24, 2020 - 8:30 a.m.

Reported by:

S. Arielle Santos

Job No.: 26639

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DEPOSITION of ARTURO CASADEVALL, MD, PhD,
before S. Arielle Santos, Certified Court
Reporter, Certified LiveNote Reporter and Notary
Public.

DATE: January 24, 2020

TIME: 8:30 A.M.

LOCATION: 1185 Avenue of the Americas
New York, New York

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2
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1 ARTURO CASADEVALL, MD, PhD
2 (Whereupon Arturo Casadevall, MD,
3 PhD is Sworn In.)
4

5 EXAMINATION

6 BY MS. STERLING:

7 Q Good morning, Dr.
8 Casadevall.

9 My name is Deborah Sterling,
10 I will be taking your deposition
11 today.

12 A Good morning.

13 Q Can you please state your
14 full name for the record.

15 A Arturo Casadevall.

16 Q Thank you.

17 Do you understand you are
18 here today to provide testimony
19 relating to declarations that you
20 provided as part of three different
21 inter partes review proceedings?

22 A I understand that I am here
23 to provide testimony regarding the
24 three declarations that I provided.

25 Q Okay.

1 ARTURO CASADEVALL, MD, PhD

2 Do you understand that your
3 testimony will be recorded and the
4 transcript will be made public?

5 A I understand that my
6 testimony will be recorded and it will
7 be made public.

8 Q Okay.

9 MR. DIAMOND: Sorry.
10 Assuming there's not any
11 confidential information that
12 comes up and is allowed in the
13 transcript, I am not aware of any
14 right now, of course, we would
15 reserve the right to make -- put
16 the transcript under seal if there
17 were some reason at some point to
18 do so.

19 MS. STERLING: Of course, as
20 would we.

21 MR. DIAMOND: Okay.

22 BY MS. STERLING:

23 Q Do you understand that you
24 are testifying today under oath and
25 under penalty of perjury?

1 ARTURO CASADEVALL, MD, PhD

2 A I understand that I am
3 testifying under oath and under
4 penalty of perjury.

5 Q That means you are here to
6 testify truthfully and accurately to
7 the best of your ability regarding the
8 opinions and information you have set
9 forth in your declarations.

10 Do you understand that?

11 A I am here to testify
12 accurately and truthfully.

13 Q Is there any reason you
14 can't testify accurately and
15 truthfully today?

16 A Not to my knowledge.

17 Q Okay.

18 Dr. Casadevall, I don't plan
19 on playing word games with you. I
20 plan on using straightforward English
21 words and sentences. If you don't
22 understand a question I'm asking,
23 please ask me for clarification and I
24 will try to rephrase or restate it in
25 a way that you understand.

1 ARTURO CASADEVALL, MD, PhD

2 Is that okay?

3 A Yes.

4 Q If you answer my question, I
5 am just going to assume you understood
6 the question.

7 Is that fair?

8 A (Nodding Head) That is
9 fair.

10 Q Okay.
11 You notice we have a court
12 reporter here today, I am sure.
13 Because the court reporter is
14 transcribing our conversation, I am
15 going to do my best to try not to
16 speak over you and I would ask that
17 you give me the same courtesy because
18 it's very difficult to transcribe two
19 conversations at once.

20 Does that make sense?

21 A That makes sense.

22 Q Okay.

23 I will also ask you give
24 audible answers; so shaking or nodding
25 a head is not going to come forward on

1 ARTURO CASADEVALL, MD, PhD
2 the transcript. I need you to use
3 audible answers.

4 Is that okay?

5 A I will provide audible
6 answers.

7 Q Thank you.

8 MR. DIAMOND: I will provide
9 audible objections.

10 MS. STERLING: Of course.

11 MR. DIAMOND: Per request.

12 BY MS. STERLING:

13 Q I am going to try to take a
14 break roughly every hour, just for
15 everyone's sanity in the room. And if
16 you need a break at any other time,
17 please let me know and I will do my
18 best to accommodate it. I will just
19 ask if there is a question pending,
20 that you answer the question before we
21 take that break.

22 Is that okay?

23 A Yes.

24 Q Okay.

25 I am going to hand you

1 ARTURO CASADEVALL, MD, PhD
2 three -- actually, before we start. I
3 see you have already got documents in
4 front of you.

5 What are those documents?

6 A These documents are three
7 declarations relating to Case IPR
8 2019/00741, related to US patent
9 number 9,732,149; Case Number IPR
10 2019/00740, related to patent
11 9,718,880; and Case Number IPR
12 2019/00739, related to patent
13 9,725,504.

14 (Whereupon a Recess
15 Commenced at 8:42 a.m. and
16 Testimony Recommenced at 8:44
17 a.m.)

18 BY MS. STERLING:

19 Q So I believe you just
20 explained what the three documents are
21 in front of you.

22 Are those clean versions of
23 your declarations or do they have any
24 notes on them?

25 A (Reviewing.) Clean versions

1 ARTURO CASADEVALL, MD, PhD
2 of my documents.

3 Q Okay.

4 I am going to ask you to set
5 those aside for a moment and I am
6 going to give you some documents.

7 MR. DIAMOND: And of course,
8 at any time during the deposition
9 today, feel free to look at any
10 documents that you need to answer
11 any of counsel's questions.

12 BY MS. STERLING:

13 Q Particularly just documents
14 I put in front of you today, please.

15 A Yes.

16 MR. DIAMOND: And of course,
17 these documents that are in front
18 of you as well are available for
19 you to look at if you want.

20 MS. STERLING: I will ask
21 you to work from the documents
22 that I'm working from today.

23 MR. DIAMOND: Counsel, he
24 can look at those documents too.

25 MS. STERLING: Fine.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q Just when we are on this
4 point, when counsel objects, you are
5 still obliged to answer the question.
6 I just want to make sure you
7 understand that, unless your counsel
8 instructs you not to answer the
9 question, and then I will hear from
10 your counsel as to why counsel is
11 giving you that instruction.

12 So in other words, even if
13 your counsel objects today, you have
14 to answer my question, unless your
15 counsel instructs you not to answer.

16 Do you understand that?

17 A I understand that.

18 Q I am going to give you three
19 documents. They are each previously
20 labeled ALXN2002.

21 There you go, sir.

22 They are each labeled
23 ALXN2002, but they are each from
24 different proceedings --

25 MR. DIAMOND: Before you ask

1 ARTURO CASADEVALL, MD, PhD
2 questions, I want to get the
3 documents.

4 MS. STERLING: I am not
5 asking any questions, Evan. Just
6 give us a minute, we are handing
7 the documents over.

8 MR. DIAMOND: You hand the
9 documents over and then you start
10 talking about them. Great.

11 BY MS. STERLING:

12 Q Dr. Casadevall, I have given
13 you three documents; in the bottom
14 right-hand corner you will see they
15 are each labeled ALXN2022.

16 Do you see that?

17 A Yes.

18 Q So one of them in front of
19 you will be for IPR 2019/00739.

20 Do you see that one?

21 A I see that one.

22 Q Okay.

23 And another one in front of
24 you will be for IPR 2019/00740.

25 Do you see that one?

1 ARTURO CASADEVALL, MD, PhD

2 A I see that one.

3 Q Okay.

4 Third one in front of you is
5 for IPR 2019/00741.

6 Do you have that one as
7 well?

8 A I have that one.

9 Q Okay.

10 So let's start with the one
11 that is labeled for IPR 2019/00739.

12 A I have it.

13 Q You have that one in front
14 of you?

15 A Yes.

16 Q Okay.

17 And this one is for the '504
18 patent.

19 Do you agree?

20 A (Reviewing.)

21 Q The patent number is on the
22 front of the document, if that's
23 helpful.

24 A Oh, yes.

25 Q Okay.

1 ARTURO CASADEVALL, MD, PhD

2 Do you recognize this
3 document?

4 A This document is a copy of a
5 declaration.

6 Q Okay.

7 It's your declaration in IPR
8 2019/00739, correct?

9 A It is a copy of my
10 declaration in IPR 2019/00739.

11 Q Okay.

12 Is your signature page in
13 there, just to confirm that it is your
14 declaration? I believe it is on the
15 page following 149.

16 A (Reviewing.) My signature
17 is down here.

18 Q Perfect. Okay.

19 Did you prepare this
20 declaration yourself?

21 A I prepared this declaration
22 with the help of counsel.

23 Q How much time did you spend
24 preparing your declaration?

25 A I have not added up all the

1 ARTURO CASADEVALL, MD, PhD
2 hours but it will be in the dozens of
3 hours.

4 Q Dozens; two dozen, ten
5 dozen?

6 A I cannot recall.

7 Q You can't give me a
8 ballpark?

9 A I cannot give you a
10 ballpark. It would be -- it's
11 certainly I would say more than ten.

12 Q Is it more than 50?

13 A I cannot -- I cannot recall
14 without looking in my records.

15 Q Would it be more than a
16 hundred?

17 A I cannot recall without
18 looking in my records.

19 Q More than 500?

20 A I think 500 would have
21 been -- I cannot recall actually. I
22 mean, I would have to look at my
23 records and look how much time I
24 spent.

25 Q Sitting here today, dozens

1 ARTURO CASADEVALL, MD, PhD
2 is the closest you can come to an
3 estimate for how much time you spent
4 preparing this declaration?

5 MR. DIAMOND: Objection to
6 form.

7 THE WITNESS: You know, I --
8 I give you more than ten hours.

9 BY MS. STERLING:

10 Q Okay.
11 Are you aware of any errors
12 in this declaration that we are
13 looking at?

14 A On re-reading them, I have
15 found several typos.

16 Q Okay.
17 Can you point me to those
18 typos?

19 A Oh, God --

20 MR. DIAMOND: Just for the
21 record, here, I think the versions
22 of Dr. Casadevall's
23 declarations --

24 MS. STERLING: Adam, I'm
25 asking the witness questions.

1 ARTURO CASADEVALL, MD, PhD

2 MR. DIAMOND: I am talking
3 right now.

4 For the record, the versions
5 of Dr. Casadevall's declarations
6 that you handed him are
7 binder-clipped, loose pages. The
8 versions that Dr. Casadevall had
9 in front of him before are bound
10 versions.

11 So you know Dr. Casadevall,
12 feel free to look at any version
13 of your declaration you feel is
14 most convenient for you in
15 answering counsel's questions.

16 THE WITNESS: Counsel, I
17 don't have it marked for me to
18 find those typos. I would have to
19 read the document again and
20 reading this document takes me a
21 couple of hours.

22 BY MS. STERLING:

23 Q So sitting here today, you
24 recall that you have some
25 typographical typed errors in your

1 ARTURO CASADEVALL, MD, PhD

2 declaration; is that fair?

3 A Right. It didn't change the
4 content of the meaning; they are just
5 typos.

6 Q Okay.

7 So there's nothing here
8 today that you would like to correct
9 in your declaration; is that fair?

10 MR. DIAMOND: Objection to
11 form. Mischaracterizes the
12 witness' testimony.

13 THE WITNESS: I stand by my
14 declaration.

15 BY MS. STERLING:

16 Q Let's look to the
17 declaration that you have in front of
18 you for IPR 2019/00740.

19 Can you find that one?

20 A 00740. (Reviewing.) I have
21 it.

22 Q And that's for US patent
23 number 9,718,880 which I will call the
24 '880 patent today.

25 A I see.

1 ARTURO CASADEVALL, MD, PhD

2 Q Okay.

3 Do you recognize this
4 document?

5 A (Reviewing.) I recognize
6 this document as my declaration.

7 Q Okay.

8 So it's your declaration in
9 IPR 2019/00740, correct?

10 A (Reviewing.) It's my
11 declaration in IPR 2019/00740.

12 Q Good.

13 Is that your signature page,
14 I believe it is following page 145 in
15 this declaration?

16 A (Reviewing.) That is my
17 signature page.

18 Q Okay.

19 Did you prepare this
20 declaration yourself?

21 A I prepared this declaration
22 with the help of counsel.

23 Q If I ask you how much time
24 did you spend preparing this
25 declaration, will you give me the same

1 ARTURO CASADEVALL, MD, PhD

2 answer as before?

3 A I will give you the same
4 answer as before.

5 Q Okay.

6 Are you aware of any errors
7 in this declaration?

8 A There may be a few typos but
9 they don't substantially change the
10 meaning of what is there. I stand by
11 the words in the declaration.

12 Q Okay.

13 Is there anything you would
14 like to correct in your declaration
15 today?

16 A There was nothing I would
17 like to correct in the declaration
18 today.

19 Q Let's look at the third
20 declaration that's in front of you;
21 that one is for IPR 2019/00741.

22 Do you have that one?

23 A I have in front of me IPR
24 2019/00741.

25 Q And that's for US patent

1 ARTURO CASADEVALL, MD, PhD
2 number 9,732,149 which I will call the
3 '149 patent; is that fair?

4 A That is for Patent Number
5 9,732,149 and I agree that we can call
6 it '149.

7 Q Thank you.
8 Did you prepare this
9 declaration yourself?

10 A Yes, with the help of
11 counsel.

12 Q And how much time did you
13 spend preparing this declaration?

14 A Same -- same answer as I
15 gave you before.

16 Q Okay.
17 Are you aware of any errors
18 in this declaration?

19 A There may be some typos.

20 Q Is there anything you would
21 like to correct in this declaration?

22 A No.

23 Q Having written and assuming
24 recently read this declaration --
25 these declarations, you are probably

1 ARTURO CASADEVALL, MD, PhD
2 aware that there's significant overlap
3 between the three; is that fair?

4 MR. DIAMOND: Sorry,
5 objection to form.

6 THE WITNESS: I think there
7 are some -- the arguments that are
8 made are similar in the three
9 declarations.

10 BY MS. STERLING:

11 Q Okay.

12 Just for the ease of today's
13 conversation, I am going to work from
14 the '504 declaration and ask you
15 questions about that declaration
16 predominantly.

17 So if I point you to a
18 paragraph in your declaration, I am
19 pointing you to the '504 declaration.

20 Do you understand that?

21 A I understand we will be
22 working from the '504 declaration.

23 MR. DIAMOND: And again --

24 MS. STERLING: Evan.

25 MR. DIAMOND: -- feel free.

1 ARTURO CASADEVALL, MD, PhD

2 MS. STERLING: Evan, this is
3 my deposition. You can object and
4 you cannot instruct the witness.
5 This is my deposition.

6 MR. DIAMOND: I am going to
7 be clear and I don't think you
8 will disagree, counsel, that the
9 witness is entitled to look at any
10 of his declarations or any
11 documents, for that matter, in
12 front of him today that he feels
13 he needs to answer any questions.
14 I think it will be improper
15 instruction.

16 MS. STERLING: Stop coaching
17 your witness.

18 MR. DIAMOND: I am not
19 coaching the witness. I am making
20 sure the record is clear.

21 BY MS. STERLING:

22 Q Dr. Casadevall, if I want to
23 talk about any specific paragraphs in
24 your '880 declaration or your '149
25 declaration, I will take you to those

1 ARTURO CASADEVALL, MD, PhD
2 declarations and point you to those
3 paragraphs; is that fair?

4 MR. DIAMOND: Objection.
5 It's an improper instruction.

6 THE WITNESS: I understand
7 that we are going to be working
8 from the '504 declaration. If you
9 want to talk to me about the other
10 declarations, we are going to have
11 to go to those documents.

12 BY MS. STERLING:

13 Q Okay.
14 Did you perform any
15 literature searches preparing your
16 declarations?

17 MR. DIAMOND: Objection to
18 form.

19 THE WITNESS: I concentrated
20 primarily in the documents and the
21 references that were -- they are
22 in. I do not recall any
23 particular literature references
24 in preparation of this document.

25 BY MS. STERLING:

1 ARTURO CASADEVALL, MD, PhD

2 Q I'm sorry, I didn't hear
3 your answer.

4 A I do not recall any
5 particular literature for this
6 document.

7 Q I asked if you performed any
8 literature searches in preparing your
9 declaration.

10 MR. DIAMOND: Objection to
11 form.

12 THE WITNESS: I performed no
13 literature searches in preparing
14 my declaration.

15 BY MS. STERLING:

16 Q How much time did you spend
17 preparing for your deposition today?

18 A I have not added up the
19 hours but we will be looking in excess
20 of 30 hours.

21 Q I am going to ask you some
22 questions about preparing for your
23 deposition. Please understand I do
24 not intend to ask you to disclose any
25 confidential information or any

1 ARTURO CASADEVALL, MD, PhD
2 discussions -- the substance of
3 discussions with your attorneys.

4 Do you understand that --

5 A I understand.

6 Q -- before I ask these
7 questions?

8 Did you meet with anyone to
9 prepare for today's deposition?

10 MR. DIAMOND: You can answer
11 that yes or no.

12 THE WITNESS: Yes.

13 BY MS. STERLING:

14 Q Who did you meet with in
15 preparation for this deposition?

16 MR. DIAMOND: You can say
17 who, if you recall.

18 THE WITNESS: I met with the
19 legal team headed by Evan Diamond.

20 BY MS. STERLING:

21 Q Can you recall the specific
22 people you met with?

23 A I met with Julia and I met
24 with another lawyer known as Gerard,
25 and another lawyer known as Vanessa.

1 ARTURO CASADEVALL, MD, PhD

2 I do not recall their last names.

3 Q Were these meetings in
4 person or by phone?

5 A They were meetings in person
6 and there have been conversations by
7 phone.

8 MR. DIAMOND: Again, just to
9 be clear, counsel is not asking
10 for the substance of any of these
11 conversations.

12 THE WITNESS: Right.

13 BY MS. STERLING:

14 Q How long did you meet with
15 the people that you just mentioned?

16 A I met -- I met three days
17 from seven to eight hours each day.
18 That would have been last Friday, last
19 Monday, and yesterday.

20 Q Okay.

21 Did you review any documents
22 in preparing for your deposition?

23 MR. DIAMOND: You can answer
24 that yes or no.

25 THE WITNESS: Yes.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q Which ones?

4 A I reviewed the documents, I
5 reviewed my depositions, and I
6 reviewed the patents, and I reviewed
7 the literature that was cited.

8 Q When you say "the literature
9 that was cited," what are you
10 referring to?

11 A I am referring to the
12 citations in these declarations, as
13 well as in the appendices.

14 MR. DIAMOND: For the
15 record, since we don't have video,
16 the witness was indicating to his
17 three declarations when he was
18 answering that question.

19 MS. STERLING: I am looking
20 at the transcript and it's also in
21 front of you, I am sure, Evan.

22 BY MS. STERLING:

23 Q Earlier you said you
24 reviewed your depositions.

25 What depositions are you

1 ARTURO CASADEVALL, MD, PhD

2 referring to?

3 A I meant declarations.

4 Q Okay.

5 So just to clarify, is it
6 fair to say you reviewed your
7 declarations, the patents, and the
8 literature that's cited in your
9 declarations?

10 A I reviewed my declarations,
11 the patents, and the literature that
12 is cited in the declarations.

13 Q You have an Appendix B in
14 your declaration, right?

15 A Yes (Reviewing.)

16 Q Is this the listing of
17 references that you were just
18 referring to?

19 MR. DIAMOND: Objection to
20 form. Mischaracterizes the
21 witness' testimony.

22 THE WITNESS: This is a list
23 of the references but there may be
24 references in here that are not
25 included in here.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q When you are saying there
4 are references in here that are not
5 included in here, what are the two
6 "heres" in your --

7 A I did not --

8 MR. DIAMOND: Please, let
9 her finish her question and then
10 also leave me time to object
11 before you answer, that way the
12 court reporter can get the best
13 record.

14 Sorry, what was your
15 question again?

16 BY MS. STERLING:

17 Q My question was, you had
18 "here" and "here" in your answer. I
19 just want to know what those "heres"
20 are?

21 A The here is the declaration.

22 Q Okay.

23 The second?

24 A There is a second here which
25 is Appendix B.

1 ARTURO CASADEVALL, MD, PhD

2 And there may be references
3 in the body of the declaration that
4 are not in Appendix B, although to my
5 knowledge, the stuff cited in Appendix
6 B is what is in the declaration.

7 Q Okay.

8 So are there any documents
9 you considered in formulating your
10 opinions that are not listed in
11 Appendix B or not cited otherwise in
12 your declaration?

13 A I -- formulation of my
14 declaration, I relied on my own
15 knowledge, I relied on what I know.
16 But there are no specific documents
17 that we -- that I can point to you
18 that I considered in the -- for the
19 preparation of this declaration, apart
20 from the documents listed in B and
21 that may be cited in the body of the
22 declaration.

23 Q Okay.

24 Do you know Barnard Trout?

25 A Barnard --

1 ARTURO CASADEVALL, MD, PhD

2 Q Trout, T-R-O-U-T?

3 A I do not recall that name.

4 Q Are you aware Dr. Trout
5 submitted a declaration in this
6 proceeding?

7 A I -- I don't know.

8 Q So is it fair to say, then,
9 you didn't review Dr. Trout's
10 declaration?

11 A I don't -- can you show me
12 Dr. Trout's declaration. You know, I
13 reviewed a lot of documents and it is
14 possible that if I saw it, I would be
15 able to recall it.

16 Q So you just told me that the
17 documents you reviewed and relied upon
18 are in Appendix B or otherwise cited
19 in your --

20 A That's right.

21 Q -- and you're now telling me
22 you reviewed a lot of documents and
23 you can't recall maybe what they are?

24 MR. DIAMOND: Objection to
25 form.

1 ARTURO CASADEVALL, MD, PhD

2 THE WITNESS: Well, there
3 are a lot of documents in B.

4 BY MS. STERLING:

5 Q Is Dr. Trout's declaration
6 listed in your Appendix B?

7 A I don't know. I would have
8 to look.

9 Q Please, go ahead.

10 MR. DIAMOND: If it's easier
11 for you, if you are going to use
12 those copies of the declarations,
13 you can remove the binder clips or
14 move them --

15 MS. STERLING: Evan, please,
16 you should have had these
17 conversations with your witness
18 before the deposition started.
19 The trial guide is pretty clear
20 that you are using one-word
21 objections and objections only.
22 Please stop instructing your
23 witness.

24 MR. DIAMOND: Gosh, I didn't
25 know you were going to give the

1 ARTURO CASADEVALL, MD, PhD
2 witness documents that are
3 extremely burdensome to open up.

4 THE WITNESS: (Reviewing.)
5 Would you point out to me where it
6 is because I cannot locate Dr.
7 Trout in this -- in Appendix B.

8 Let me see (Reviewing.) I
9 don't see Dr. Trout's declaration
10 in Appendix B.

11 BY MS. STERLING:

12 Q Okay.

13 So is it fair to assume,
14 then, you did not review Dr. Trout's
15 declaration?

16 MR. DIAMOND: Objection to
17 form.

18 THE WITNESS: I do not
19 recall right now Dr. Trout's
20 declaration. I may have reviewed
21 it but I do not recall it.

22 BY MS. STERLING:

23 Q Had you reviewed it, would
24 you have listed it in Appendix B?

25 MR. DIAMOND: Objection to

1 ARTURO CASADEVALL, MD, PhD
2 form.

3 THE WITNESS: The documents
4 in Appendix B are those that are
5 cited. I reviewed what was in
6 Appendix B and I reviewed the
7 references cited herein.

8 BY MS. STERLING:

9 Q You are not -- did you
10 review other documents aside from
11 Appendix B and whatever else may be
12 cited in your declaration?

13 A I reviewed what was cited in
14 the declaration and I do not recall
15 specific document that I reviewed
16 outside of these documents.

17 Q Okay.

18 Have you had any contact
19 with Dr. Trout in connection with this
20 proceeding?

21 A I do not believe I know Dr.
22 Trout.

23 Q Okay.

24 Do you know Michel
25 Nussenzweig?

1 ARTURO CASADEVALL, MD, PhD

2 A Yes, I do know Michel
3 Nussenzweig.

4 Q Are you aware Dr.
5 Nussenzweig submitted a declaration in
6 this proceeding?

7 A Yes.

8 Q Did you review Dr.
9 Nussenzweig's declaration?

10 A I reviewed his declaration.

11 Q When did you review his
12 declaration?

13 A Maybe a month ago.

14 Q Did you review it before you
15 signed your declaration in these
16 proceedings?

17 A I do not recall Nussenzweig
18 being in Appendix B.

19 Q That wasn't my question.
20 My question was --

21 A No, because that's very
22 important, right? Because if it's in
23 Appendix B, that would be related to
24 my signature.

25 I know that I reviewed

1 ARTURO CASADEVALL, MD, PhD
2 Nussenzweig's declaration but I cannot
3 tell you the -- I do not recall the
4 exact date.

5 Q If you had reviewed Dr.
6 Nussenzweig's declaration and you're
7 relying on any content in Dr.
8 Nussenzweig's declaration, would you
9 had cited it in Appendix B?

10 MR. DIAMOND: Objection to
11 form. Calls for speculation.

12 THE WITNESS: If the
13 declaration from Nussenzweig was
14 relevant to the case and to the
15 declaration, it would have been
16 cited.

17 BY MS. STERLING:

18 Q Have you had any contact
19 with Dr. Nussenzweig in connection
20 with this proceeding?

21 A I have had no-contact orders
22 with Dr. Nussenzweig in connection
23 with this proceeding.

24 Q How do you know Dr.
25 Nussenzweig?

1 ARTURO CASADEVALL, MD, PhD

2 A I know Dr. Nussenzweig
3 because he is a person in the field.
4 He's a well-known immunologist and we
5 were students together at NYU, both in
6 the MD-PhD program.

7 Q Do you know Daniel Bazarko?

8 A Who?

9 Q Daniel Bazarko,
10 B-A-Z-A-R-K-O?

11 A No.

12 Q Are you aware that Mr.
13 Bazarko submitted a declaration in
14 this proceeding?

15 A I remember the name -- yes,
16 I remember seeing that name and I
17 remember looking at the document.

18 Q Do you recall when you
19 looked at Mr. Bazarko's declaration?

20 A It would be roughly -- it
21 would be a while ago.

22 Q Can you give me --

23 A No, let's say more than a
24 month.

25 Q More than a month.

1 ARTURO CASADEVALL, MD, PhD

2 Fewer than six months?

3 A Well, I became involved with
4 this in the spring so it would have to
5 be in that period of time.

6 Q Okay. So you reviewed Mr.
7 Bazarko's declaration.

8 Do you recall if you
9 reviewed it before you signed your
10 declarations?

11 A I do not recall the date.

12 Q If Mr. Bazarko's declaration
13 was relevant to your opinions in your
14 declaration, would you have cited it
15 in Appendix B?

16 MR. DIAMOND: Objection to
17 form.

18 THE WITNESS: (Reviewing.)
19 I think if Dr. Bazarko's
20 declaration would have bared on
21 the arguments that we have here,
22 it would have been cited in
23 Appendix B.

24 BY MS. STERLING:

25 Q In preparing for your

1 ARTURO CASADEVALL, MD, PhD
2 deposition, did you review documents
3 that are not cited in Appendix B or
4 otherwise cited in your declaration?

5 A I did not review documents
6 that were not in Appendix B or not
7 cited in the declaration.

8 Q But you just told me you
9 reviewed some declarations, correct,
10 not cited in Appendix B --

11 A No, I --

12 MR. DIAMOND: Sorry,
13 please -- let her finish her
14 question and then give me chance
15 to object.

16 Objection to form.
17 Mischaracterizes the witness'
18 testimony.

19 THE WITNESS: I said to you
20 that I have read the Bazarko
21 declaration. I said to you if it
22 had been cited -- if it was
23 relevant to these cases, it would
24 have been cited in here.

25 BY MS. STERLING:

1 ARTURO CASADEVALL, MD, PhD

2 Q So you did not review either
3 the Bazarko declaration or the
4 Nussenzweig declaration in preparation
5 for your deposition?

6 MR. DIAMOND: Objection to
7 form.

8 THE WITNESS: I went -- I
9 went through --

10 MR. DIAMOND: In answering
11 any questions about preparing for
12 your deposition, just, please, I
13 caution you not to reveal the
14 substance of any communications
15 that you had with counsel.

16 THE WITNESS: I think the
17 Nussenzweig I know I definitely
18 reviewed in preparation. And I
19 think the Bazarko one probably
20 been seen also.

21 But if you asking me yes or
22 no, I do not recall exactly when
23 or the content at this point.

24 BY MS. STERLING:

25 Q Correct me if I am wrong, I

1 ARTURO CASADEVALL, MD, PhD
2 believe you just said you reviewed the
3 Nussenzweig declaration in preparation
4 for the deposition.

5 Is that accurate?

6 MR. DIAMOND: Objection to
7 form. Mischaracterizes.

8 THE WITNESS: I reviewed the
9 declaration prior to the
10 deposition.

11 BY MS. STERLING:

12 Q Did you review any documents
13 cited in the Nussenzweig declaration?

14 A No, I do not believe -- I do
15 not believe I read -- I did not
16 review -- well, I do not recall what
17 was cited in the deposition. If you
18 want me to answer that, you have to
19 give me the deposition and we can look
20 at the references and then we can
21 match the references with those in
22 Appendix B.

23 Q I believe you said
24 deposition twice in that answer.

25 Are you referring to --

1 ARTURO CASADEVALL, MD, PhD

2 A I'm sorry, I am not a
3 lawyer. Declarations, depositions.
4 This is stuff that's normal to you but
5 to me you are going to have to bear
6 with -- and please correct me and I
7 will come back to you and be correct.

8 This is a deposition. These
9 are declarations. I know.

10 Q Okay.

11 I just want to make sure we
12 are talking about the --

13 A I know. It's -- this is the
14 deposition.

15 Q Okay.

16 If I catch any of these
17 errors, I will try to help you correct
18 them, okay?

19 A Thank you. Thank you.

20 Q You're welcome. Okay.

21 Dr. Casadevall, as I
22 mentioned, we are going to be working
23 predominantly off the '504
24 declaration. I want to make sure that
25 is the one in front of you. And you

1 ARTURO CASADEVALL, MD, PhD
2 know, if you prefer, you can use the
3 one with the spiral binding, if that's
4 your preference. I just ask if you
5 are going to --

6 A It is my preference, it's
7 easier to open.

8 Q That's totally fine with me.
9 I would like to see those documents
10 first.

11 MS. KOLIBACHUK: We have
12 another copy.

13 MR. DIAMOND: And you can
14 also -- feel free to inspect those
15 but we also have copies for you
16 also.

17 MS. STERLING: I would like
18 to note for the record that these
19 declarations have been modified
20 solely to insert tabs noting where
21 Appendix A and Appendix B begin.
22 Other than that, these are the
23 same declarations, I believe, that
24 are the exhibits in the
25 declaration --

1 ARTURO CASADEVALL, MD, PhD

2 MR. DIAMOND: That's our
3 understanding as well.

4 MS. STERLING: Let me
5 finish.

6 MR. DIAMOND: Sure, I wanted
7 to say that's our understanding.

8 MS. STERLING: Okay.

9 BY MS. STERLING:

10 Q Do you have the declaration
11 for the '504 patent in IPR 2019/00739
12 in front of you, Dr. Casadevall?

13 A I have my declaration for
14 patent the '504 patent in front of me.

15 Q Okay. Let's turn to page
16 11. Let me know when you're there.

17 A (Reviewing.) I am on page
18 11.

19 Q Okay.
20 You have a header there,
21 header V, Legal Standards.

22 Do you see that?

23 A I see header Legal
24 Standards.

25 Q Okay.

1 ARTURO CASADEVALL, MD, PhD

2 So this section entitled
3 Legal Standards, it starts here on
4 page 11, and paragraph 32, and it
5 spans through paragraph 47 -- yes, it
6 spans through paragraph 47.

7 Do you agree?

8 A (Reviewing.) Paragraph, not
9 page.

10 Q Yes.

11 A (Reviewing.) Yes, I agree
12 it spans from 32 to 47.

13 Q Okay.

14 Let's look at paragraph 35.
15 First sentence in that paragraph says,
16 I understand that a document may
17 "incorporate by reference" the
18 disclosure of another document.

19 Do you see that sentence?

20 A I see the sentence, I
21 understand that a document may
22 incorporate by reference the
23 disclosure of another document.

24 Q From where did that
25 understanding come?

1 ARTURO CASADEVALL, MD, PhD

2 Did it come from counsel for
3 Alexion?

4 A It was explained to me --
5 yes, it was explained to me by
6 counsel.

7 Q Okay.

8 Similarly, in paragraph 36,
9 the second sentence says, "I
10 understand a document does not
11 anticipate just because it refers to a
12 molecule or formulation that is later
13 revealed to be the one claimed."

14 Do you see that sentence?

15 A I understand a document does
16 not anticipate just because it refers
17 to a molecule --

18 (Whereupon a Discussion is
19 Held Off the Record.)

20 THE WITNESS: I understand a
21 document does not anticipate just
22 because it refers to a molecule or
23 formulation that is later to be --
24 that is later revealed to be the
25 one claimed.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q Again, is it fair to assume
4 this understanding came from counsel
5 from Alexion?

6 A That understanding came from
7 counsel.

8 Q Is it fair to say throughout
9 this legal standards section that your
10 understandings came from counsel for
11 Alexion?

12 I understand you are not an
13 attorney, so did these understandings
14 come from counsel from Alexion?

15 A The understandings in the
16 legal section between paragraph 32 and
17 paragraph 47 came from counsel.

18 Q Okay.

19 Let's look at paragraph 50,
20 it's on page 16.

21 Let me know when you're
22 there.

23 A I am here.

24 Q Okay.

25 So we don't do it twice, do

1 ARTURO CASADEVALL, MD, PhD
2 you want to read the first sentence
3 into the record for me.

4 A "I understand that the '504
5 patent reflects the work of Alexion
6 scientists in developing SOLIRIS as a
7 safe and effective treatment for
8 paroxysmal nocturnal hemoglobinuria
9 (PNH)."

10 Q From where did that
11 understanding come?

12 A That understanding came from
13 my review of the patent.

14 Q Let's turn to paragraph 134.
15 It's on page 68, if that's helpful.

16 A (Reviewing.) I am at
17 paragraph 134.

18 Q The second sentence there
19 that begins, "I understand..."

20 Can you read that sentence
21 into the record, please?

22 A "I understand that SOLIRIS
23 was the first antibody with a heavy
24 chain of its kind containing a hybrid
25 of sequences from both IgG2 and IgG4

1 ARTURO CASADEVALL, MD, PhD
2 constant regions to be clinically
3 tested in humans and that Alexion was
4 the first to show that such an
5 antibody could be safe and effective
6 when administered to human patients."

7 Q From where did that
8 understanding come from?

9 A From reading the documents,
10 reading the patent and this sentence
11 cites AMG1033 at 1257 to 58.

12 Q The next sentence says, "I
13 also understand that SOLIRIS was the
14 first FDA-approved product containing
15 Alexion's uniquely-engineered heavy
16 chain constant region."

17 Do you see that sentence?

18 A I see that sentence which is
19 read: "I also understand that SOLIRIS
20 was the first FDA-approved product
21 containing Alexion's
22 uniquely-engineered heavy chain
23 constant region."

24 Q From where did that
25 understanding come?

1 ARTURO CASADEVALL, MD, PhD

2 A From my review of the
3 documents and if they are involved,
4 they are cited in Appendix B.

5 Q Can you recall any specific
6 document that helped you with this
7 understanding?

8 A (Reviewing.) I can't recall
9 a specific document to cite on this.

10 Q Let's turn to paragraph 140.
11 Why don't you go ahead and
12 read the first sentence of paragraph
13 140 into the record for us.

14 A "I understand from Dr.
15 Balthasar's deposition that he admits
16 key facts contrary to his position
17 regarding POSA's understanding of
18 eculizumab as of March 15, 2007."

19 Q From where did that
20 understanding come?

21 A From reading Dr. Balthasar's
22 deposition.

23 Q The transcript from the
24 deposition?

25 A I had a copy of the

1 ARTURO CASADEVALL, MD, PhD

2 transcript of the deposition.

3 Q When did you read the copy
4 of the transcript from the deposition,
5 do you recall?

6 A Sometime in the fall.

7 Q Let's turn to paragraph 154,
8 please.

9 A I am at paragraph 154.

10 Q Perfect.

11 The last sentence of that
12 paragraph begins, "I understand the
13 use of an antibody..."

14 Are you there?

15 A I see it.

16 Q Can you read that sentence
17 into the record.

18 A "I understand that the use
19 of an antibody in clinical trials by
20 itself is insufficient to disclose the
21 antibody sequence. And so this does
22 not change my opinion that a full
23 length sequence of eculizumab was not
24 publicly available prior to March 15,
25 2007."

1 ARTURO CASADEVALL, MD, PhD

2 Q From where did that
3 understanding come?

4 A That understanding comes
5 from my experience. It comes from
6 reviewing the documents.

7 Q Can you point me to any
8 documents that tell you the use of an
9 antibody in clinical trials by itself
10 is insufficient to disclose the
11 antibody sequence?

12 A I don't understand your
13 question.

14 Q You say, "I understand that
15 the use of an antibody in clinical
16 trials by itself is insufficient to
17 disclose the antibody sequence."

18 Do you see that in that
19 sentence?

20 A I see that.

21 Q You just said that
22 understanding came from documents that
23 you reviewed.

24 A It came from my experience.
25 That's what I said first. And then I

1 ARTURO CASADEVALL, MD, PhD
2 said from documents that I reviewed.
3 And my experience includes taking
4 antibodies to clinical trials, seeing
5 IRB documents, things like that.

6 Q I'm asking you about
7 documents that you reviewed that you
8 mentioned.

9 Can you point me to any
10 documents that show that the use of an
11 antibody in clinical trials by itself
12 is insufficient to disclose the
13 antibody sequence?

14 A I don't have -- I cannot
15 recall a document that states that in
16 particular.

17 Q Let's go to paragraph 216,
18 please. It's on page 113.

19 A (Reviewing.)

20 Q Let me know --

21 A 216?

22 Q Yes, 216 on page 113.

23 A Yes.

24 Q You're there?

25 A Yes.

1 ARTURO CASADEVALL, MD, PhD

2 Q Can you read the first
3 sentence in to the record, please?

4 A "Further, I understand that
5 Alexion has obtained to full amnio
6 acid sequence of the" --
7 parenthesis -- "5G1.1 antibody of
8 Evans from the HB-11625 hybridoma."

9 MR. DIAMOND: Just for the
10 record, I think you said
11 parenthesis but the document has
12 quotation marks.

13 THE WITNESS: Quotation
14 marks. Quotation marks.

15 BY MS. STERLING:

16 Q From where did that
17 understanding come?

18 A That came from -- the
19 document -- document ALXN2075 at 2.3,
20 which was a report -- which is
21 GenScript final report, Antibody Full
22 Length Sequencing of Hybridoma 5.1
23 T175, Order Number U856UEK140-1
24 November 15, 2019.

25 Q Let's look at paragraph 281,

1 ARTURO CASADEVALL, MD, PhD
2 please. If it's helpful, that's on
3 page 146. Let me know when you're
4 there.

5 A (Reviewing.) 281?

6 Q Paragraph 281. Yes.

7 A Yes.

8 Q Can you read paragraph 281
9 into the record?

10 A I understand that SOLIRIS
11 is -- "I understand that since its
12 approval, SOLIRIS has been
13 commercially successful with over 1
14 billion in US sales each year in each
15 of these three years."

16 Q Okay.

17 From where did that
18 understanding come?

19 A I do not recall exactly
20 where the reference is for the 1
21 billion in US sales.

22 Q Based on your answer, are
23 you saying it's in a reference
24 somewhere?

25 A I don't -- like I said,

1 ARTURO CASADEVALL, MD, PhD
2 there's no reference here so I do not
3 recall exactly where that comment came
4 from or that statement came from, but
5 it is my understanding and I stand by
6 it, that is.

7 Q Where did the understanding
8 come from, that's what I am trying to
9 understand?

10 A Like I said, I don't recall
11 exactly where it came from but it is
12 my understanding that it is a very
13 successful drug.

14 Q Specifically, you are
15 talking about commercial success,
16 right?

17 A I am talking commercial
18 success of SOLIRIS.

19 Q But you are not sure from
20 where you obtained this information?

21 MR. DIAMOND: Objection to
22 form.

23 THE WITNESS: I do not
24 recall where I obtained the
25 information for the 1 billion.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q So you haven't given us any
4 information that we can go to and
5 verify that, correct?

6 MR. DIAMOND: Objection.

7 Sorry, objection.

8 Mischaracterizes the witness'
9 testimony.

10 THE WITNESS: I do not
11 recall where I got the information
12 for the one billion.

13 BY MS. STERLING:

14 Q Okay. Let's go back to your
15 legal principles section.

16 I am going to focus on the
17 anticipation part that's at paragraphs
18 36 to 40. Let me know when you're
19 there.

20 A (Reviewing.)

21 Q I apologize, your
22 anticipation actually starts at
23 paragraph 34. I think I may have said
24 36.

25 MR. DIAMOND: So we are

1 ARTURO CASADEVALL, MD, PhD

2 turning to paragraph 34?

3 MS. STERLING: Yes.

4 MR. DIAMOND: Okay.

5 BY MS. STERLING:

6 Q So you agree with me this is
7 a section entitled, Standards for
8 Anticipation?

9 A This section is Standards
10 for Anticipation.

11 Q In paragraph 40 of that
12 section you say, "I have also been
13 informed by counsel that to anticipate
14 a claimed invention, a prior art
15 reference must be 'enabled' such that
16 a POSA could make and use the claimed
17 invention without undue
18 experimentation."

19 Do you see that sentence?

20 A "I have been informed by
21 counsel to anticipate a claimed
22 invention, a prior art reference must
23 be 'enabled' so that a POSA could make
24 and use the claimed invention without
25 undue experimentation."

1 ARTURO CASADEVALL, MD, PhD

2 Q The next sentence you say:

3 "I understand that the PTAB will
4 consider the following factors in
5 assessing whether a disclosure
6 requires undue experimentation." And
7 then you list eight factors.

8 Do you see that sentence?

9 A I see that sentence.

10 Q You say "the PTAB will
11 consider the following factors."

12 Did you consider those
13 factors in preparing your declaration?

14 MR. DIAMOND: Objection to
15 form.

16 THE WITNESS: This section
17 was -- as I stated, was provided
18 -- legal standards were provided
19 to me by counsel.

20 BY MS. STERLING:

21 Q I understand that the legal
22 standards were provided to you by
23 counsel.

24 I am trying to understand,
25 did you apply them to your analysis

1 ARTURO CASADEVALL, MD, PhD

2 here in your declaration?

3 A I applied these legal
4 standards to my analysis in this
5 declaration.

6 Q Okay.

7 In your consideration of
8 anticipation, did you do this analysis
9 that you are saying the PTAB will
10 consider?

11 A In my analysis I consider
12 what a POSA would have known prior to
13 March 15, 2007, and that includes the
14 eight items that you have there.

15 Q Where did you set forth your
16 analysis based on these eight factors
17 in your declaration?

18 A I don't understand your
19 question.

20 Q I believe you just told me
21 that you did consider these eight
22 factors in your analysis in your
23 declaration.

24 Is that fair?

25 A Yes, I considered those

1 ARTURO CASADEVALL, MD, PhD
2 eight.

3 Q Where did you set forth that
4 analysis in your declaration?

5 MR. DIAMOND: Objection to
6 form.

7 THE WITNESS: I considered
8 it as I read through the Balthasar
9 deposition, and I considered it
10 and when -- when I analyzed what a
11 POSA would have known prior to
12 March 15, 2007.

13 BY MS. STERLING:

14 Q Okay.

15 As part of your analysis
16 regarding anticipation, did you
17 consider whether any prior art
18 reference of record was enabling using
19 these eight factors?

20 A I considered whether any
21 prior art -- any prior reference was
22 enabling -- yes.

23 Q And you used these eight
24 factors?

25 A I used these factors. They

1 ARTURO CASADEVALL, MD, PhD
2 may not all apply to the same
3 reference. But, yes, all of them, but
4 they have to apply.

5 Q Can you show me where you
6 have applied these eight factors in
7 your declaration?

8 MR. DIAMOND: Objection to
9 form.

10 THE WITNESS: I cannot show
11 you but I can tell you a POSA
12 prior to March 15, 2007, could not
13 have generated eculizumab without
14 experimentation, guidance.

15 The process of working
16 examples, knowing the nature of
17 the invention, considering the
18 state of prior art, the relative
19 skill in the art of predictability
20 or unpredictability of the art.

21 BY MS. STERLING:

22 Q Yes. So I'm asking where
23 have you discussed these factors in
24 your declaration.

25 Do you discuss them anywhere

1 ARTURO CASADEVALL, MD, PhD

2 other than in paragraph 40?

3 A The issues of anticipation
4 are mentioned in the declaration. We
5 would have to look for them but I
6 cannot give you an exact page number
7 right now.

8 MR. DIAMOND: We have been
9 going close to an hour now, good
10 time for a break.

11 MS. STERLING: No, I have a
12 few questions then we can take a
13 break.

14 THE WITNESS: I want to take
15 a break.

16 MS. STERLING: I am in the
17 middle of a question, can we
18 finish this question?

19 MR. DIAMOND: Counsel, you
20 are not in the middle of a
21 question you had a question and
22 answer.

23 MS. STERLING: I started
24 talking and then you spoke up.

25 MR. DIAMOND: No, you were

1 ARTURO CASADEVALL, MD, PhD
2 not.

3 Dr. Casadevall would you
4 like to take a break?

5 THE WITNESS: I would like
6 to take a break.

7 MR. DIAMOND: Okay. Taking
8 a break.

9 MS. STERLING: Okay. We are
10 off the record.

11 (Whereupon a Recess
12 Commenced at 9:34 a.m. and
13 Testimony Recommenced at 9:49
14 a.m.)

15 BY MS. STERLING:

16 Q Welcome back, Dr.
17 Casadevall.

18 During the break, did you
19 talk with your counsel about any
20 substance of your deposition?

21 A No.

22 Q Before the break, we were
23 looking at paragraph 40 in your
24 declaration and I am looking at the
25 eight factors that you have listed

1 ARTURO CASADEVALL, MD, PhD

2 there.

3 Do you recall that?

4 A I recall that.

5 Q So I was asking you, is
6 there anywhere in your declaration
7 where you set forth your analysis of
8 these eight factors.

9 Is there?

10 MR. DIAMOND: Objection to
11 form. Asked and answered.

12 THE WITNESS: I think the
13 eight factors are considered in my
14 opinion, of course.

15 BY MS. STERLING:

16 Q So where do you discuss
17 these eight factors other than here in
18 paragraph 40?

19 A Well, you can look at for
20 the nature of invention and you can
21 see -- and for example, when you look
22 at -- page 55, a POSA of March 15,
23 2007, would have understood eculizumab
24 to be an IgG isotype humanized
25 antibody, the nature of the invention

1 ARTURO CASADEVALL, MD, PhD

2 would have been considered.

3 Q And where are you looking at
4 on page 55?

5 A Page 55, Section 5.

6 Q So you're telling me the
7 invention here is an IgG4-isotype
8 humanized antibody?

9 MR. DIAMOND: Objection to
10 form.

11 THE WITNESS: I am saying
12 that eculizumab would have been
13 understood to be an IgG4-isotype
14 humanized antibody.

15 BY MS. STERLING:

16 Q And that is the nature of
17 the invention here, an IgG4-isotype
18 humanized antibody?

19 MR. DIAMOND: Objection to
20 form.

21 THE WITNESS: You asked me
22 to show you an example and I gave
23 you an example where I would
24 consider the nature of the
25 invention. But this statement

1 ARTURO CASADEVALL, MD, PhD
2 here is eculizumab was considered
3 to be an IgG4-isotype humanized
4 antibody prior to March 15, 2007.

5 BY MS. STERLING:

6 Q I am trying to understand
7 how that explains the nature of the
8 invention.

9 So you are saying the nature
10 of the invention here is an
11 IgG4-isotype humanized antibody?

12 A The nature of the invention
13 that for which this case is, is
14 SOLIRIS.

15 Q Okay.

16 Where else have you
17 discussed -- SOLIRIS is eculizumab,
18 right?

19 MR. DIAMOND: Objection to
20 form.

21 THE WITNESS: Could you
22 repeat the question?

23 BY MS. STERLING:

24 Q SOLIRIS is eculizumab,
25 correct?

1 ARTURO CASADEVALL, MD, PhD

2 A SOLIRIS is the name -- the
3 name by which it is marketed.
4 Eculizumab is the name of the
5 antibody.

6 Q Is the nature of the
7 invention the only factor you can
8 point me to a discussion of?

9 A Well, we can go through the
10 -- for example, the mechanism of
11 action of SOLIRIS.

12 Looking at page 21, Section
13 C. I would have considered the
14 quantity of experimentation necessary,
15 the amount of guidance presented, the
16 presence -- an absence of working
17 examples, the nature of the invention,
18 the state of the prior art, the
19 relative skill of those in the art,
20 and the
21 predictability/unpredictability of the
22 art, and the breadth of those claims.

23 Q And where did you set forth
24 that analysis for the board?

25 A The analysis -- the

1 ARTURO CASADEVALL, MD, PhD
2 conclusions to that analysis are set
3 forth in my deposition -- in my
4 declaration.

5 Q But I am trying to figure
6 out where they are so we can review
7 them.

8 A Well, you know, you can ask
9 me -- like I said, I pointed to you
10 two examples and I told you what I
11 considered for those examples and we
12 can go page by page, but I don't know
13 if that's what you want to do.

14 Q So wherever it is you set
15 forth these eight factors, how have
16 you weighed them -- or did you weigh
17 them?

18 Let's start there.

19 Did you weigh them?

20 MR. DIAMOND: Objection to
21 form.

22 THE WITNESS: I did not
23 weigh -- I did not weigh them in
24 the sense of putting weight on
25 them. But I considered them and

1 ARTURO CASADEVALL, MD, PhD
2 they -- my understanding is to
3 consider them together.

4 BY MS. STERLING:

5 Q So you did not weigh them,
6 is what you are saying?

7 MR. DIAMOND: Sorry.

8 Objection to form.

9 THE WITNESS: Can I ask what
10 you mean by "weigh them"?

11 BY MS. STERLING:

12 Q Did you give one more weight
13 than another one?

14 For example, did you give
15 Factor 1 more weight than Factor 5?

16 A No, I took them in total. I
17 took them in total. I considered them
18 all together. I did not pick one out
19 and give it more weight than the
20 other.

21 Q So my understanding is
22 you're telling me you discussed each
23 of these factors throughout your
24 declaration; is that fair?

25 A What -- what I have in my

1 ARTURO CASADEVALL, MD, PhD
2 declaration is an analysis that in
3 some cases may -- in some cases may
4 focus more on one factor than the
5 other. All eight factors were
6 considered throughout the declaration.

7 Q Okay.

8 I would like to know where
9 you have done this enablement analysis
10 with regard to anticipation and giving
11 us your analysis on enablement here.

12 A I don't understand your
13 question.

14 Q So to anticipate, I am
15 looking at paragraph 40.

16 You have an understanding
17 from counsel that to anticipate a
18 claimed invention a prior art
19 reference must be enabled.

20 Do you see that in your
21 paragraph 40?

22 A Yes.

23 Q And you understand that the
24 PTAB is going to follow -- or consider
25 these eight factors in that analysis.

1 ARTURO CASADEVALL, MD, PhD

2 I'm asking you where have
3 you performed this analysis in your
4 declaration --

5 A So I.

6 Q -- to come to conclusion of
7 enablement?

8 MR. DIAMOND: Please give
9 counsel time to finish her
10 question so the court reporter can
11 get the questions and answers
12 down.

13 THE WITNESS: I apologize.

14 BY MS. STERLING:

15 Q It's quite all right.

16 A So I will give you -- I will
17 give you -- first of all, I will give
18 you one example.

19 Consider a POSA prior to
20 March 15, 2007, having by some magical
21 way or some way of clairvoyance the
22 sequence of eculizumab. I would
23 basically have considered the quantity
24 of the experiment necessary to enable
25 the invention; they would have to do

1 ARTURO CASADEVALL, MD, PhD
2 clinical trials, they would have to do
3 a lot of scientific work, the amount
4 of guidance presented, the presence of
5 actual working examples, there being
6 no prior working exams, the nature of
7 the invention, what does it do, the
8 state of the prior art, what would
9 have known beforehand, how are
10 patients treated beforehand, the
11 relative skill of those in the art,
12 the predictability/unpredictability of
13 the art, and the breadth of those
14 claims.

15 So, that's an example.

16 Q Yes. And I'm asking where
17 you put this analysis together to
18 weight these factors and come to a
19 conclusion of enablement or lack
20 thereof.

21 I am just not seeing it
22 anywhere in your declaration.

23 MR. DIAMOND: Counsel, I
24 object to your characterization.
25 You can ask the question anyway

1 ARTURO CASADEVALL, MD, PhD

2 you want but don't testify.

3 BY MS. STERLING:

4 Q I am asking you to point it
5 to me in your declaration.

6 A Why don't we look at page
7 number 1, Claims 1-3 and 7-10 of
8 patent '504 -- so let's look at -- let
9 me see.

10 Let's look at page 91. So
11 if you look at the claims 1 and 3 and
12 7-10 of the '504 patent were not
13 anticipated by Hillmen.

14 Well, you look at the claims
15 and you look at the publication of
16 Hillmen and you see that Hillmen
17 refers to the Thomas reference which
18 is -- and you would have concluded
19 that eculizumab is a humanized IgG4.

20 That would be an example of
21 how this would have been done.

22 Q I'm asking you to point me
23 to an analysis of enablement here in
24 this section.

25 You have taken us to Section

1 ARTURO CASADEVALL, MD, PhD

2 6 -- 7(b).

3 Point me to enablement
4 analysis where you weigh those factors
5 in this section, please?

6 A (Reviewing.) I will take
7 you to page 119.

8 Q Actually, you took us to
9 Section B. I'm asking you about that
10 first and then we can move on to
11 somewhere else.

12 MR. DIAMOND: Counsel, it's
13 not appropriate for you to
14 interrupt the witness while
15 answering.

16 Dr. Casadevall, can you
17 please continue your testimony.

18 MS. STERLING: I would like
19 you to answer the question I have
20 asked. Evan, please stop.

21 MR. DIAMOND: Counsel, we
22 will call the Board if you
23 interrupt the witness.

24 MS. STERLING: Let's do
25 that. Let's go off the record.

1 ARTURO CASADEVALL, MD, PhD

2 We are going to call the board.

3 (Whereupon a Recess

4 Commenced at 10:00 a.m. and

5 Testimony Recommenced at 10:01

6 a.m.)

7 BY MS. STERLING:

8 Q Let's go back on the record.

9 Thank you.

10 Dr. Casadevall, you had
11 taken us to Section 7(b), and I asked
12 you to point me where in that
13 section -- because when -- let me
14 rephrase that.

15 You took us to 7(b) because
16 you said there would be a discussion
17 of your enablement analysis there.
18 And I asked you to point me to your
19 discussion of your enablement analysis
20 in this section.

21 Can you please do so?

22 A Can you tell me what page
23 are we at?

24 Q You had directed us to page
25 91, Section 7(b), Entitled Claims 1 to

1 ARTURO CASADEVALL, MD, PhD

2 3 and 7 to 10 of the '504 patent --

3 A Perhaps I didn't understand
4 your question.

5 Q That's okay.

6 A Because what I answered you
7 was how you take a look at these
8 claims and then you match them with
9 the eight criteria previously, and I
10 gave you an example of how I did it.

11 Q But I'm asking you to point
12 me to that example. And you took us
13 to this section which is paragraph 174
14 to 184, and said this was an example.

15 I'm asking you to point me
16 to where in these paragraphs that you
17 directed us to that you did an
18 enablement analysis.

19 A Well, let's look at 177. "I
20 understand from counsel that, for a
21 document to anticipate a patent claim,
22 every element of the patent claim
23 needs to be disclosed in at least one
24 document, either expressly, as stated
25 in the document, or inherently,

1 ARTURO CASADEVALL, MD, PhD
2 meaning that that base on what is
3 stated in the document itself, a POSA
4 prior to March 15, 2007, would know
5 the claimed invention was necessarily
6 disclosed by that document."

7 There is no document that
8 gives you eculizumab and the sequence.
9 That's an example.

10 Q So you are saying this is a
11 factor from your eight factors for
12 your enablement analysis?

13 A I said that based on my
14 understanding of your question, this
15 my answer.

16 Q Which factor of the eight
17 does paragraph 178 go to?

18 A What factor? I don't
19 understand your question.

20 Q We are discussing the eight
21 factors that you set forth for
22 enablement analysis in your paragraph
23 40.

24 A (Reviewing.)

25 Q Do you recall that's what we

1 ARTURO CASADEVALL, MD, PhD

2 are discussing right now?

3 A Yeah. But for example --

4 Q So I'm asking you -- let me
5 point us to paragraph 177, as an
6 example of your analysis for those
7 eight factors. I'm asking you which
8 of the factors are reflected in
9 paragraph 177.

10 A (Reviewing.) All eight
11 factors will have to be reflected.
12 You will note the quantity of
13 experimentation -- you would know the
14 quantity of experimentation necessary,
15 the amount of guidance presented, the
16 presence of absence of working
17 examples, the nature of the invention,
18 the state of the prior art, the
19 relative skill of those in the art,
20 and the predictability --
21 predictability or unpredictability of
22 the art and breadth of the claims.

23 Q And you're telling me that
24 paragraph 177 reflects your analysis
25 of those eight factors?

1 ARTURO CASADEVALL, MD, PhD

2 A Paragraph 177 states that
3 for a document to anticipate a patent
4 claim, every document needs to be
5 disclosed in one document. And you
6 can take those eight factors and you
7 can -- you can -- you can apply them
8 to any document.

9 Q I'm sorry.

10 Where does paragraph 177 say
11 you can take those eight factors and
12 apply them to any document?

13 A It's not stated -- it is not
14 stated in paragraph 177.

15 Q Okay.

16 But 177 is where you take me
17 to for an analysis of those eight
18 factors; that's an example?

19 A Paragraph 177 is an example.

20 Q Okay.

21 You were wanting to look at
22 a different example, earlier you were
23 pointing me to somewhere else in your
24 declaration.

25 Would you like to take me

1 ARTURO CASADEVALL, MD, PhD

2 there?

3 A I don't recall which one it
4 was because I was interrupted and
5 brought back to this one.

6 Q Well, this is the one we
7 were talking about at the time and you
8 needed to answer the question that was
9 pending.

10 So you can't recall anywhere
11 else in your declaration where you
12 discuss these eight factors?

13 A The declaration -- the words
14 in the declaration, the analysis in
15 the declaration considers all eight
16 factors.

17 Q And where does it show how
18 you weighed those factors and did your
19 enablement analysis?

20 A I -- as I answered
21 previously, I did not assign weight to
22 the factors. I considered the factors
23 in total.

24 Q Okay. Let's look at
25 paragraph 42 of your declaration.

1 ARTURO CASADEVALL, MD, PhD

2 A (Reviewing.)

3 Q It's on page 14, if that's
4 helpful.

5 A (Reviewing.) Yes.

6 Q This is in the section
7 entitled, Standards for Obviousness,
8 correct?

9 A That is in the section --
10 paragraph 43 is in the Section B,
11 Standard for Obviousness.

12 Q What is your understanding
13 of obviousness?

14 MR. DIAMOND: Just to make
15 sure, you asked for 42 or 43? I
16 want to make sure we are looking
17 at the right paragraph. I think
18 you said 42, he might have said
19 43. I want to make sure.

20 MS. STERLING: When I look
21 at a specific paragraph, I will
22 point that out.

23 BY MS. STERLING:

24 Q What is your understanding
25 of obviousness?

1 ARTURO CASADEVALL, MD, PhD

2 A My understanding of
3 obviousness is as laid out in the
4 declaration.

5 "I have been informed by
6 counsel that to establish obviousness,
7 Amgen must show that the claimed
8 invention as a whole would have been
9 obvious to a POSA prior to the date on
10 which a claimed invention was invented
11 without the benefit or hindsight
12 knowledge.

13 "I have been informed that
14 for the purposes of this proceedings,
15 the relevant date of invention or
16 priority date is March 15, 2007, the
17 earliest filing date for the '504
18 patent."

19 Q Okay.

20 In paragraph 42, you have
21 been informed by counsel that the
22 board will consider three factors in
23 determining this obviousness analysis.

24 Do you see that paragraph?

25 MR. DIAMOND: Objection to

1 ARTURO CASADEVALL, MD, PhD
2 form. Mischaracterizes the
3 document.

4 THE WITNESS: I have been
5 informed by counsel that the board
6 will consider the following
7 factors in determining whether
8 Amgen has met its burden to
9 establish invalidity based on
10 obviousness: 1, the scope and
11 content of the prior art; 2,
12 differences between the prior art
13 and claims at issue; 3, the level
14 of ordinary skill in the art; and
15 4, objective evidence of
16 non-obviousness.

17 BY MS. STERLING:

18 Q Is it fair to say that you,
19 yourself, considered these factors in
20 your analysis on obviousness?

21 A I considered these factors
22 in my analysis.

23 Q You have been retained as an
24 expert consultant in this case; is
25 that accurate?

1 ARTURO CASADEVALL, MD, PhD

2 A I have been retained as an
3 expert -- yes, a consultant. I don't
4 know what the exact legal term is, but
5 I think that's close enough.

6 Q Okay.

7 So in paragraph 23 of your
8 declaration, it's on page 8. Let me
9 know when you're there.

10 A 23. (Reviewing.)

11 Q You say, "I am an expert in
12 the design, development, evaluation,
13 and testing (including biological and
14 physicochemical analysis) of
15 monoclonal antibodies for use in human
16 clinical therapy, including humanized
17 monoclonal antibodies."

18 Do you see that?

19 A Counsel, sorry. I thought
20 -- I was looking at paragraph 23. Can
21 you direct me to the correct
22 paragraph.

23 Q I am reading from paragraph
24 23.

25 A I see but you began at, I am

1 ARTURO CASADEVALL, MD, PhD

2 an expert...

3 Q Yes, in design development.

4 Yes.

5 A But you began -- that's why

6 I missed it.

7 Q Okay.

8 But you'd agree that's what

9 paragraph 23 says?

10 A I would add to it, "As

11 reflected by my education and

12 experience as discussed above and

13 further reflected in my curriculum

14 vitae..."

15 And the part that you

16 read -- I would read it back just to

17 make sure that it's correct.

18 "I am an expert in design,

19 development, evaluation, and testing,

20 including biological and

21 physicochemical analysis of monoclonal

22 antibodies for use in human clinical

23 therapy, including humanized

24 monoclonal antibodies. I was also an

25 expert in this field prior to

1 ARTURO CASADEVALL, MD, PhD
2 March 15, 2007. A copy curriculum
3 vitae is attached to this declaration
4 as Appendix A."

5 Q Do you want to finish with
6 the exhibit number to complete the
7 sentence?

8 A Exhibit Number ALXN2023.

9 Q Okay.
10 Do you have an MD and PhD?

11 A I have an MD and a PhD.

12 Q As an MD, was your
13 fellowship in infectious diseases?

14 A My fellowship was in
15 infectious diseases.

16 Q Have you ever treated any
17 patients for hematological disorders?

18 A Infectious disease doctors
19 treat everyone who gets an infection,
20 that would include many patient with
21 hematological disorders.

22 Q Have you ever treated a
23 patient with hematological disorders?

24 A For hematological disorders?

25 Q Yes.

1 ARTURO CASADEVALL, MD, PhD

2 A I have treated them for
3 infectious diseases.

4 Q But have you treated them
5 for hematological disorders?

6 A Your question -- I asked
7 you -- you began by asking me about
8 infectious diseases. I am an expert
9 in infectious disease.

10 Q I asked if your fellowship
11 was in infectious disease --

12 A My fellowship was in
13 infectious diseases.

14 MR. DIAMOND: Allow counsel
15 to finish her question and give me
16 a chance to object.

17 THE WITNESS: I apologize.

18 MR. DIAMOND: Ask your
19 question.

20 BY MS. STERLING:

21 Q It's an awkward proceeding.
22 It's an awkward present conversation.

23 So have you ever treated any
24 patients for hematological disease?

25 A Have I -- the answer is yes.

1 ARTURO CASADEVALL, MD, PhD

2 When I was a resident at Bellevue
3 Hospital, we often had patients with
4 hematological diseases and I would
5 have been a physician at the time.

6 Q Have you ever treated a
7 patient for PNH?

8 Is it okay if I call --

9 A Yes, PNH.

10 Q Have you ever treated a
11 patient for PNH?

12 A I was thinking about that.
13 I can't recall a specific patient, but
14 it is possible that among the
15 thousands of patients that I saw in my
16 training, that there would have been a
17 patient with PNH.

18 Q When you say the thousands
19 of patients that you saw in your
20 training, when was -- what is the
21 training you were referring to?

22 A I was an intern at Bellevue
23 Hospital between 1985 and 1986. I was
24 then a resident at Bellevue Hospital
25 between '95 -- '86 and '88, and then I

1 ARTURO CASADEVALL, MD, PhD
2 did my fellowship infectious diseases
3 between '88 and '92.

4 Q If I am understanding you
5 correctly, and if I am not, please
6 correct me, you say you may have
7 treated patients with PNH during your
8 training and that would span the years
9 1985 to 1992.

10 Is that accurate?

11 A If I treated patients with
12 paroxysmal nocturnal hemoglobinuria
13 for a hematological disorder, it would
14 have been during my residency; that
15 is, '85 to '88.

16 Q '85 to '88, okay.

17 And if you were to treat any
18 patients for PNH in that time frame,
19 do you recall what treatment you may
20 have used?

21 A There was no specific
22 treatment. It was supportive.

23 Q What do you mean by
24 "supportive"?

25 A It means you could not

1 ARTURO CASADEVALL, MD, PhD
2 address the underlying conditions or
3 the underlying disease; that if they
4 become anemic, you would give them
5 transfusions and that you treated the
6 symptoms of the disease.

7 Q So these were treatment
8 options for a patient with PNH in this
9 time frame, '85 to '88 that you
10 mentioned?

11 A That is to the best of my
12 recollection, yes.

13 Q Okay.
14 Were you aware of eculizumab
15 before being retained for this case?

16 A I had heard about the
17 antibody but -- but I had heard about
18 it. I have seen it because it's often
19 listed in review articles as a
20 clinically used antibody.

21 Q Okay.
22 Do you have any experience
23 in marketing therapeutic antibodies?

24 A No -- well, the only
25 experience that I have had has been

1 ARTURO CASADEVALL, MD, PhD
2 when there have been market analysis
3 of antibodies that I have been
4 involved in developing.

5 Q You have done that --

6 MR. DIAMOND: And just
7 before -- I want to caution the
8 witness. I don't know if any of
9 this gets into any third-party
10 confidential information. If
11 anything -- you know, any research
12 you have done does get into
13 third-party confidential
14 information, just let counsel know
15 because I don't think she wants
16 you to --

17 THE WITNESS: Yeah, I --

18 MS. STERLING: Before you
19 start, that's totally accurate. I
20 don't want you to divulge -- if
21 you are under any confidentiality
22 to any companies you have done
23 research with, I don't want you to
24 divulge that to me.

25 I am looking generally what

1 ARTURO CASADEVALL, MD, PhD
2 aspects you are involved in.

3 THE WITNESS: So --

4 BY MS. STERLING:

5 Q I will ask the question.

6 I believe you mentioned you
7 were involved in market analysis of
8 antibodies.

9 Could you please explain
10 generally without divulging
11 confidences what that analysis
12 entails?

13 A Yes. So I will give you my
14 experience with developing
15 anti-cryptococcal antibodies that came
16 from my laboratory. These antibodies,
17 what the market analysis was done,
18 people look at the number of cases of
19 cryptococcus, the number of doses that
20 would be needed to treat it, the
21 potential charge of -- the cost of
22 making it, the cost of selling it, the
23 likelihood that it would be used, the
24 competing -- competing therapies; was
25 there therapy, was there not therapy

1 ARTURO CASADEVALL, MD, PhD

2 available.

3 So those were factors on it.

4 But I will state that I am not an
5 expert in market analysis. My
6 expertise is, as defined in this
7 declaration -- yeah, declaration --
8 and so I am speaking, you know, from
9 some distance as to how this process
10 goes.

11 Q Okay.

12 Let's turn to paragraph 96
13 in your declaration it is on page 40,
14 if that's helpful.

15 A I have it.

16 Q Why don't you take a second
17 and read it to yourself so you're
18 oriented in the discussion.

19 A (Reviewing.)

20 Q You can feel free to read
21 paragraphs around it, too, if that's
22 helpful.

23 A I have read the paragraph.

24 Q Okay.

25 In this paragraph, you are

1 ARTURO CASADEVALL, MD, PhD
2 referring to the convention of
3 referring to early stage antibodies by
4 reference to the original mice
5 hybridoma and mice antibody from which
6 they are developed.

7 Is that fair, generally?

8 MR. DIAMOND: Objection to
9 form.

10 THE WITNESS: When you see
11 an alphanumeric such as 5G1.1 that
12 often refers to the hybridoma from
13 which it was developed.

14 BY MS. STERLING:

15 Q Okay.

16 That answered my next
17 question which was, 5G1.1 is an
18 example of this type of naming
19 convention you are referring to,
20 right?

21 A It involves the context.

22 Q In this context -- in the
23 context of this declaration, the 5G1.1
24 nomenclature that you are referring
25 to, it's an example of that convention

1 ARTURO CASADEVALL, MD, PhD
2 of referring to the original mice
3 hybridoma.

4 Is that accurate?

5 MR. DIAMOND: Sorry.

6 Objection to form.

7 THE WITNESS: You can see
8 other examples here where
9 humanized 5G1.1 or h5G1.1 is used
10 or 5G1.1 is used alone. So it
11 depends on the context of how it
12 is written.

13 BY MS. STERLING:

14 Q Okay.

15 You state here, "Alexion
16 identified the '5G1.1' hybridoma as
17 producing the '5G1.1' mice antibody,
18 and often referred to the humanized
19 antibodies and fragments derived from
20 the 5G1.1 antibody as 'humanized
21 5G1.1' or 'h5G1.1.'"

22 Do you see that?

23 A I see that.

24 Q I believe we are on the same
25 page.

1 ARTURO CASADEVALL, MD, PhD

2 5G1.1 is what Alexion has
3 identified as being related to the
4 hybridoma producing the 5G1.1 mice
5 antibody, and there may be other
6 letters or numbers or words associated
7 with that 5G1.1 to further clarify.

8 Is that fair?

9 MR. DIAMOND: Objection to
10 form.

11 THE WITNESS: I think you
12 have to read it in context. I
13 think that looking at an
14 alphanumeric, you cannot conclude
15 unless you see the rest of the
16 sentence.

17 And I point out there are
18 multiple references at the end of
19 that sentence that would have
20 provided context for how those
21 antibodies were labeled.

22 BY MS. STERLING:

23 Q So what does humanized 5G1.1
24 convey to a POSA --

25 MR. DIAMOND: Objection.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q -- as you have used it in
4 this sentence as one of your examples?

5 MR. DIAMOND: Objection to
6 form.

7 THE WITNESS: Humanized
8 5G1.1, in the context of Thomas,
9 would mean to me an IgG4.

10 BY MS. STERLING:

11 Q Okay.

12 But would it also convey
13 more generally a humanized version of
14 the 5G1.1 mice -- original mice
15 antibody?

16 A You have to be more
17 specific. The word generally is a
18 problem.

19 Q So -- we are going to get
20 into specifics. I am trying to start
21 at a higher level, if that's okay with
22 you.

23 When you see humanized
24 5G1.1, without getting into specifics
25 of sequence or portions, would this

1 ARTURO CASADEVALL, MD, PhD
2 convey to a person of ordinary skill
3 in the art that we are looking at a
4 humanized form of the antibody 5G1.1,
5 the original mice hybridoma? Just
6 generally.

7 MR. DIAMOND: Objection to
8 form.

9 THE WITNESS: I think
10 generally would tell you you have
11 a humanized 5G1.1. But whether it
12 refers to your Alexion antibody,
13 you would need to put it in
14 context. You would need to see
15 what reference it is.

16 BY MS. STERLING:

17 Q Okay. And those are
18 questions I am going to get to.

19 The h5G1.1 that is your next
20 example here.

21 Does that H also imply or
22 express humanized --

23 MR. DIAMOND: Objection to
24 form.

25 BY MS. STERLING:

1 ARTURO CASADEVALL, MD, PhD

2 Q -- under this conventional
3 nomenclature?

4 A In the field, the H can
5 refer to human. It can refer to
6 humanized. It could refer to even
7 another sort of nomenclature. But I
8 think that I would have to look at the
9 reference and then I could tell you
10 what the H means.

11 Q Do you recall just off the
12 top of your head if you have any
13 references referring to a human 5G1.1?

14 A I used it as an example. I
15 did not recall the references in that
16 case. I use it as an example that an
17 H could be -- could be a human, for
18 example, to distinguish it from a
19 mouse, IgG1, some investigators may
20 write H5G.1, others may write m5G.1.
21 But I do not have reference for you
22 off the top of my head.

23 Q But I believe you also said
24 h5G1.1 could be humanized 5G1.1,
25 depending on the context.

1 ARTURO CASADEVALL, MD, PhD

2 A Well, in the context Thomas,
3 5G.1 has been humanized to an IgG4,
4 constant region.

5 Q Okay.

6 5G1.1 is an antibody that
7 binds human complement component C5;
8 is that accurate?

9 MR. DIAMOND: Objection.

10 Now that the question got
11 interrupted for the clarification
12 of the reporter, could you read
13 the whole question again so we can
14 hear it.

15 BY MS. STERLING:

16 Q Is 5G1.1 an antibody that
17 binds human complement component C5?

18 MR. DIAMOND: Objection to
19 form.

20 THE WITNESS: It depends on
21 the context.

22 BY MS. STERLING:

23 Q What context are you looking
24 for?

25 A The context will be the rest

1 ARTURO CASADEVALL, MD, PhD
2 of the sentence and the reference at
3 the end.

4 Q So you're telling me 5G1.1
5 may not be an anti-C5 antibody?

6 A I am telling you that 5G1.1
7 -- you will have to know the context
8 in what -- in what form it is as to
9 whether it would bind a complement
10 component of C5 or not.

11 Q Are you aware of any
12 references here that talk about 5G1.1
13 as something other than an anti-C5
14 antibody?

15 A I am not aware of those
16 references but you cannot conclude
17 from 5G1.1 that it binds complement
18 component 5.

19 Q When you say you can't
20 conclude from 5G1.1, are you just
21 considering that number and those
22 letters in isolation -- or those
23 numbers and that letter in isolation?

24 A I am considering the
25 multiple times that this alphanumeric

1 ARTURO CASADEVALL, MD, PhD
2 is being used in the documents cited
3 in this declarations, in which in some
4 cases it has been referred to in
5 one -- in one type and in others --
6 being referred to something else. You
7 have to look at the context to know
8 what you're looking at.

9 Q So you're telling me there
10 are documents of record that tell us
11 that 5G1.1 is not a C5 anti -- anti-C5
12 antibody?

13 A I didn't say that. What I
14 am saying is that you cannot conclude
15 that it binds 5G1.1, based on --
16 stating it as such.

17 Q So you're telling me when
18 Alexion's discussing 5G1.1 as it's
19 antibody and discussing it as anti-C5
20 antibody, you would still see if you
21 see 5G1.1 in those documents, you are
22 not convinced that it's an anti-C5
23 antibody?

24 MR. DIAMOND: Objection to
25 form.

1 ARTURO CASADEVALL, MD, PhD

2 THE WITNESS: I would have
3 to read the sentence in the
4 context for me to make a
5 conclusion as to whether that
6 antibody bound 5G1 or not.

7 BY MS. STERLING:

8 Q So you're telling me a
9 person of ordinary skill in the art,
10 knowing about Alexion's 5G1.1 would in
11 some situations not consider that
12 antibody to be an anti-C5 antibody?

13 MR. DIAMOND: Objection to
14 form. Asked and answered.

15 THE WITNESS: Which Alexion
16 5.1 are you referring to?

17 BY MS. STERLING:

18 Q Let's talk about the 5G1.1
19 in the patent.

20 MR. DIAMOND: What patent?

21 MS. STERLING: At issue
22 here, the '504 patent.

23 THE WITNESS: Can I see the
24 patent?

25 MS. STERLING: Yes, you may.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q I am handing you what's been
4 previously marked AMG101 [sic]. It is
5 the '504 patent.

6 A (Reviewing.)

7 I am looking for a
8 reference.

9 MR. DIAMOND: Just to be
10 clear, there's no question pending
11 right now; am I correct, counsel?

12 MS. STERLING: That's
13 correct. There's no question
14 pending.

15 MR. DIAMOND: Wait for
16 counsel to ask you a question
17 before you answer anything.

18 THE WITNESS: (Reviewing.)

19 BY MS. STERLING:

20 Q Actually, let's look at a
21 different document. You can set the
22 patent aside.

23 I am going to hand you
24 what's been previously marked as
25 AMG1021.

1 ARTURO CASADEVALL, MD, PhD

2 A (Reviewing.)

3 Q This is a document entitled,
4 Eculizumab Alexion, and it lists
5 Mariana Kaplan as the author.

6 Do you see that?

7 A I see Eculizumab Alexion
8 with Mariana Kaplan as the author.

9 Q Okay.

10 On that first page, in
11 right-hand column, there's a box at
12 the start of the column.

13 Do you see that --

14 A (Reviewing.)

15 Q -- box?

16 A Yes.

17 Q Okay.

18 And that box lists the
19 originator, Alexion Pharmaceuticals,
20 Inc.

21 MR. DIAMOND: Objection to
22 form.

23 THE WITNESS: It states --
24 the words that are stated is
25 originator, Alexion

1 ARTURO CASADEVALL, MD, PhD

2 Pharmaceuticals, Inc.

3 BY MS. STERLING:

4 Q Yes.

5 And the next line says,

6 Status Phase II Clinical.

7 Do you see that?

8 A I see Status Phase II

9 Clinical.

10 Q And then the next entry is,

11 Indication: Dermatological disease,

12 glomerulonephritis, nephritis,

13 pemphigus --

14 A Pemphigus.

15 Q -- pemphigus, psoriasis,

16 rheumatoid arthritis, systemic lupus,

17 erythematosus.

18 Do you see that?

19 A I see Indication:

20 Dermatological disease,

21 glomerulonephritis, nephritis,

22 pemphigus, psoriasis, rheumatoid

23 arthritis, systemic lupus,

24 erythematosus.

25 Q Okay.

1 ARTURO CASADEVALL, MD, PhD

2 And then the Action:

3 Complement cascade inhibitor.

4 Do you see that?

5 A Complement cascade

6 inhibitor.

7 Q Do you see the biotechnology

8 line: Monoclonal antibody humanized?

9 A I see the biotechnology

10 line: Monoclonal antibody humanized.

11 Q And then there's a line that

12 says synonyms.

13 Do you see that line?

14 A I see the line synonyms.

15 Q Okay.

16 And there we see 5G1.1,

17 h5G1.1, C5 complement inhibitor

18 (Alexion), and h5G1.1 scFv.

19 Do you see those entries?

20 A I see those entries.

21 Q Below that there's a CAS

22 registry database for 5G1.1 entry.

23 Do you see that?

24 MR. DIAMOND: Objection to

25 form.

1 ARTURO CASADEVALL, MD, PhD

2 THE WITNESS: I don't know
3 what a CAS database registry is.

4 BY MS. STERLING:

5 Q Okay.

6 So here we are seeing
7 mentions of 5G1.1.

8 Would you agree in this
9 context, the 5G1.1 and the various
10 variations of it that are mentioned
11 here would be considered to be C5
12 complement inhibitor monoclonal
13 antibodies?

14 MR. DIAMOND: Objection to
15 form.

16 THE WITNESS: I would have
17 to read the context of the
18 question. To me, these are
19 different molecules.

20 BY MS. STERLING:

21 Q Are you familiar with --
22 these are different molecules but do
23 they connote an anti-C5 monoclonal
24 antibody to you?

25 MR. DIAMOND: Objection to

1 ARTURO CASADEVALL, MD, PhD
2 form.

3 THE WITNESS: The 5G1.1 is
4 often referred to -- is a mouse
5 antibody that is a C5 complement
6 inhibitor.

7 BY MS. STERLING:

8 Q Okay.

9 You would agree that a
10 person of ordinary skill in the art
11 would have understood that prior to
12 March 2007?

13 MR. DIAMOND: Objection to
14 form.

15 BY MS. STERLING:

16 Q Right?

17 A A POSA at that time would
18 have been very confused by the word
19 synonyms; for these molecules are not
20 synonyms.

21 Q Okay.

22 But my question was more in
23 March 2007, a person of ordinary skill
24 in the art would have understood that
25 5G1.1 can refer to a mice monoclonal

1 ARTURO CASADEVALL, MD, PhD
2 antibody that's a C5 complement
3 inhibitor, right?

4 A I think in March -- prior to
5 March 2007, March 15, 2007, a person
6 skilled -- a POSA, would have found
7 references of 5G1.1 as a murine
8 antibody that is a complement C5
9 inhibitor.

10 MR. DIAMOND: For the record
11 murine is M-U-R-I-N-E, antibody.

12 BY MS. STERLING:

13 Q Let's go back to your
14 declaration, paragraph 97. It's right
15 across the page from where we just
16 read.

17 A 97?

18 Q 97, yes.

19 A Paragraph 97?

20 Q Paragraph 97.

21 A I have it.

22 Q The second sentence of that
23 paragraph, you talk about terminology
24 indicating that isotype of a humanized
25 antibody and you give two examples.

1 ARTURO CASADEVALL, MD, PhD

2 Your examples are hG --
3 sorry -- h5G1.1, HuG4, and the second
4 one is h5G1.1, HuG2/G4?

5 Do you see that?

6 A I see that.

7 Q What does the HuG4 in your
8 first example mean?

9 A Human constant region 4.

10 Q What does the HuG2/G4 in
11 your second example mean?

12 A It's vague. It would -- it
13 would suggest IgG2 or 4, but it would
14 give you no information at all in the
15 structure.

16 Q You are saying it would
17 suggest IgG2 or 4?

18 A It's a vague statement. You
19 basically -- if you have human G2, you
20 know is human IgG2. If you have a
21 human IgG4, you know it is. But when
22 you put that slash in there, you don't
23 know what you have.

24 Q And you're telling me a
25 person of ordinary skill in the art in

1 ARTURO CASADEVALL, MD, PhD
2 March 2007 wouldn't have known what
3 this was?

4 A I think a person of -- a
5 POSA at the time would have looked at
6 that and seen that it may have
7 components of G2 and G4. But for all
8 you know, it could have been another
9 terminology. This is not a -- this is
10 not a precise way of expressing a
11 structure.

12 Q Let's go over to paragraph
13 102.

14 A Paragraph 102?

15 Q 102.

16 A (Reviewing.)

17 Q First sentence there, it
18 says, "Accordingly, I agree with Dr.
19 Balthasar's deposition testimony that
20 a POSA as of March 15, 2007, would
21 have understood that the term
22 "eculizumab" referred to a single
23 unique antibody with a single defined
24 structure and primary amino acid
25 sequence, not a class or genus of

1 ARTURO CASADEVALL, MD, PhD

2 antibodies."

3 Do you see that sentence?

4 A I see that sentence.

5 Q So it's your opinion that
6 before March 2007, the term
7 "eculizumab" refers to one and only
8 one single unique antibody with a
9 single defined structure and primary
10 amino acid sequence?

11 A It's my opinion that prior
12 to March 15, 2007, the term
13 "eculizumab" refers to one antibody
14 with one defined structure.

15 Q In the previous paragraph
16 you talk about INN and USAN names in
17 the last sentence.

18 Do you see that sentence?

19 A (Reviewing.) Yes, I see the
20 sentence.

21 Q Okay.

22 You say, "Generally, these
23 names, these INN/USAN names with
24 respect to humanized monoclonal
25 antibodies would refer to one and only

1 ARTURO CASADEVALL, MD, PhD
2 one specific antibody as defined by
3 its unique primary amino acid
4 sequence."

5 Do you see that?

6 A Yes.

7 Q Is eculizumab the INN name
8 for SOLIRIS?

9 MR. DIAMOND: Objection to
10 form.

11 BY MS. STERLING:

12 Q Is eculizumab an INN name?

13 A Eculizumab is the name that
14 was given once it was in further
15 development. And it would have
16 meant the -- and eculizumab, when you
17 look in the context of Thomas, you
18 would have seen that it is a humanized
19 IgG4.

20 Q I am just asking you simply
21 is eculizumab under the INN naming
22 convention, is that the name that was
23 given to this unique sequence?

24 MR. DIAMOND: Objection to
25 form.

1 ARTURO CASADEVALL, MD, PhD

2 THE WITNESS: I can only
3 answer by saying that eculizumab
4 would have known as Thomas IgG4,
5 humanized IgG4.

6 BY MS. STERLING:

7 Q You're telling me eculizumab
8 is not an INN name for this antibody?

9 MR. DIAMOND: Objection to
10 form.

11 THE WITNESS: Eculizumab is
12 the entity defined by Thomas as an
13 IgG4 humanized antibody.

14 BY MS. STERLING:

15 Q So is eculizumab a name
16 under the INN naming convention or
17 not?

18 A (Reviewing.) Under the INN
19 naming convention, a humanized
20 monoclonal antibody, which eculizumab
21 would have been known as an human
22 IgG4, would have referred to a
23 specific molecule.

24 Q So is eculizumab the INN
25 name -- is eculizumab an INN naming

1 ARTURO CASADEVALL, MD, PhD

2 convention name or is it not?

3 Or can you not tell me?

4 That's fine. If you say you don't

5 know, that's fine as well.

6 MR. DIAMOND: Objection to

7 the form.

8 THE WITNESS: You know, I

9 would have to review this to make

10 sure that the entities in INN are

11 -- will match the conditions.

12 But I go back to the thing

13 that eculizumab is one entity and

14 eculizumab was, prior to March 15,

15 2004 [sic], known as a humanized

16 IgG4.

17 BY MS. STERLING:

18 Q Okay.

19 Why don't we give you

20 Exhibit Number 2046, that's been

21 previously marked, for the record.

22 This is the guidelines on

23 the use of International

24 Non-Proprietary Names, or INNs for

25 pharmaceutical substances.

1 ARTURO CASADEVALL, MD, PhD

2 Do you see that title?

3 A Yes.

4 Q Are you familiar with the
5 INN naming convention?

6 A I have seen this document
7 before.

8 Q I am not asking about the
9 document.

10 Just in general, the INN
11 naming convention, are you familiar
12 with it?

13 A I am familiar with -- I am
14 familiar with the naming of
15 antibodies. As to whether it is
16 particularly identical to the INN
17 convention, I cannot -- I don't know.

18 Q Okay.

19 But you discuss the INN
20 guidelines in your declaration,
21 correct?

22 A I -- I discuss the INN
23 guidelines in my declaration.

24 Q And in fact, you cite to
25 this document in your declaration at

1 ARTURO CASADEVALL, MD, PhD

2 paragraph 1000?

3 MR. DIAMOND: Paragraph

4 1000.

5 MS. STERLING: Sorry,

6 paragraph 100.

7 MR. DIAMOND: Paragraph 100.

8 Okay.

9 BY MS. STERLING:

10 Q Do you see that?

11 A I stand by what I wrote
12 here. "A POSA would have understood
13 that this INN/USAN names with respect
14 to humanized monoclonal antibodies
15 would refer to one and only one
16 specific antibody as defined by its
17 unique primary structure and
18 sequence."

19 Q Okay.

20 And then in paragraph 101,
21 you go through these naming
22 conventions.

23 Do you see that?

24 A Paragraph 101.

25 Q Yes.

1 ARTURO CASADEVALL, MD, PhD

2 A Under the non-proprietary
3 name existing in 2007, monoclonal
4 antibodies all received the suffix
5 -mab, and humanized monoclonals would
6 have been -zumab --

7 MR. DIAMOND: Dr.

8 Casadevall, if you can read slower
9 so the court reporter can get the
10 testimony.

11 THE WITNESS: I'm sorry.

12 "Under the non-proprietary
13 naming system that existed in
14 2007, monoclonal antibodies all
15 received the suffix -mab, and
16 humanized monoclonal antibodies in
17 particular were given the suffix
18 -zumab." Alexion document
19 ALXN2045 at 1210, ALXN2046 at 27.

20 BY MS. STERLING:

21 Q Okay.

22 Your next sentence explains
23 that antibodies modifying the body's
24 immune response were given the
25 additional naming element L-I, or li,

1 ARTURO CASADEVALL, MD, PhD

2 before the suffix, correct?

3 A That is correct.

4 Q And you say, Accordingly, an
5 immunomodulatory humanized monoclonal
6 antibody would end with the suffix
7 '-lizumab' and then it would be given
8 a unique arbitrary prefix, e.g., and
9 you've given the example of ("ecu-").

10 A Right.

11 Q Would you agree with me that
12 based on this naming convention and
13 your testimony here, that eculizumab
14 would be the naming -- a naming
15 convention under the INN proprietary
16 name standards or guidelines?

17 A Under the text of my
18 declaration, eculizumab has been named
19 under that naming convention since it
20 modify -- since it inhibits complement
21 C5 cleavage, it will meet the criteria
22 of an immunomodulatory monoclonal
23 humanized monoclonal antibody.

24 Q And when are antibodies
25 given -- I believe you actually tell

1 ARTURO CASADEVALL, MD, PhD
2 us when antibodies are given their INN
3 name in paragraph 99.

4 You say -- let me know when
5 you're there.

6 A 99.

7 Q Okay.

8 The second sentence: "A
9 POSA would have understood that after
10 a specific humanized monoclonal
11 antibody with single unique sequence
12 had progressed into clinical
13 development, it may be assigned
14 non-proprietary name by authorities,
15 including INN and USAN, e.g.,
16 eculizumab."

17 Do you see that?

18 A "A POSA would have
19 understood that after specific
20 humanized monoclonal antibody with
21 single unique sequence had progressed
22 into clinical development, it may be
23 assigned non-proprietary name by
24 authorities, including INN and USAN...
25 e.g., eculizumab." Is how the

1 ARTURO CASADEVALL, MD, PhD

2 sentence ends?

3 A "...for example,
4 eculizumab." Yes.

5 Q So once the antibodies are
6 given these names, these antibodies
7 have a single unique sequence; is that
8 correct?

9 MR. DIAMOND: Objection to
10 form.

11 THE WITNESS: I think once
12 the antibodies are given a unique
13 name, they are understood to have,
14 as noted in paragraph 101, a
15 specific antibody as defined by
16 its unique primary amino acid
17 sequence.

18 BY MS. STERLING:

19 Q Okay.

20 So setting aside whether or
21 not you knew what that sequence is,
22 for a person of ordinary skill in the
23 art, before March 2007, seeing the
24 word eculizumab and person of ordinary
25 skill in the art would understand it

1 ARTURO CASADEVALL, MD, PhD
2 would be in this context, right.

3 So a person of ordinary
4 skill in the art, prior to 2005 [sic],
5 seeing the word eculizumab, they would
6 know that that was an antibody that
7 had a single unique sequence; is that
8 fair?

9 MR. DIAMOND: Sorry.
10 Counsel, you said prior to 2005.

11 MS. STERLING: Sorry, 2007.

12 MR. DIAMOND: Ask the
13 question again. I just want to
14 make sure the record is clear.

15 BY MS. STERLING:

16 Q Dr. Casadevall, is my
17 question unclear aside from the 2005,
18 2007?

19 A It was not clear and the
20 date is critical.

21 Q Okay. So let's start again.

22 A person of ordinary skill
23 in the art -- and you understand who
24 that is for these proceedings,
25 correct? Okay.

1 ARTURO CASADEVALL, MD, PhD

2 A Yes.

3 Q A person of ordinary skill
4 in the art seeing the term
5 "eculizumab" in context, prior to
6 March 2007, would they have understood
7 that eculizumab would have had a
8 single defined unique amino acid
9 sequence?

10 MR. DIAMOND: Objection to
11 form.

12 THE WITNESS: It's a very
13 long question.

14 What I can tell you is that
15 if you see eculizumab in the
16 literature, you would have
17 concluded that it is a humanized
18 IgG4 as cited by Thomas.

19 BY MS. STERLING:

20 Q My question was, based on
21 these INN naming conventions -- we are
22 going to get to Thomas, don't worry
23 and I will let you talk about Thomas
24 as much as you want.

25 Under these INN naming

1 ARTURO CASADEVALL, MD, PhD
2 conventions, seeing the word
3 eculizumab, would a person of ordinary
4 skill in the art have understood that
5 to have a single unique sequence?

6 A You see, once the name is
7 assigned, it is understood to be only
8 one specific antibody as defined by
9 its unique primary amino acid
10 sequence.

11 Q Okay.

12 So if you were using
13 eculizumab at a clinical trial, you
14 would understand that that eculizumab
15 being used in that clinical trial has
16 a single specific antibody defined by
17 a unique primary amino acid sequence?

18 MR. DIAMOND: Objection to
19 form. Lack of foundation.

20 THE WITNESS: In a clinical
21 trial, you would know that you are
22 using it. But I don't think
23 you -- you don't know -- you know
24 they are using eculizumab and you
25 know that it's an antibody that is

1 ARTURO CASADEVALL, MD, PhD
2 defined by its unique primary
3 amino acid sequence.

4 BY MS. STERLING:

5 Q Okay.

6 And just while you have
7 document 2046 in front of you, on page
8 27 there's a heading, Monoclonal
9 Antibodies about two-thirds way down
10 the page.

11 Do you see that?

12 A (Reviewing.) Excuse me, can
13 you repeat the question.

14 Q I said on page 27 there's a
15 header about two-thirds down the page
16 that says, Monoclonal Antibodies.

17 Do you see that?

18 A Right here. Yes, I see it.

19 Q Okay.

20 And this then gives a scheme
21 for common stems that's being
22 developed for naming monoclonal
23 antibodies; is that fair?

24 A Yes.

25 Q So the general stem is -mab,

1 ARTURO CASADEVALL, MD, PhD

2 that's point 1.

3 Do you see that?

4 A General stem is -mab.

5 Q Okay.

6 And the point 2 gives
7 sub-stems for the source of the
8 product.

9 Do you see that?

10 A Sub-stems for the source of
11 the product, I see that.

12 Q And then humanized version
13 is -zu.

14 Yes?

15 A Human will have a -u.

16 Q Humanized I asked for --
17 humanized is -zu.

18 Correct?

19 A Oh, I see at the bottom
20 humanized would be -zu.

21 Q Do you see a sub-stem that
22 is -za anywhere here in this list?

23 MR. DIAMOND: Objection to
24 form.

25 THE WITNESS: Do I see a

1 ARTURO CASADEVALL, MD, PhD
2 what? I don't understand your
3 question.

4 BY MS. STERLING:

5 Q Do you see a -- okay.
6 So there's a human sub-stem
7 which is -u.

8 Do you see that?

9 A I see that.

10 Q There is a rat sub-stem
11 which is an -a.

12 Do you see that?

13 A I see that.

14 Q There is a hamster sub-stem
15 which is an -e.

16 Do you see that?

17 A I see that.

18 Q There is a primate sub-stem
19 which is an -i.

20 Do you see that?

21 A I see that.

22 Q There is a mice sub-stem
23 which is an -o.

24 Do you see that?

25 A Yes.

1 ARTURO CASADEVALL, MD, PhD

2 Q There is chimers sub-stem
3 which is -xi.

4 Do you see that?

5 A I see that.

6 Q And then there's humanized
7 which is -zu.

8 Do you see that?

9 A I see that.

10 Q Are any of these sub-stems
11 -za?

12 MR. DIAMOND: Objection to
13 form.

14 THE WITNESS: Are any of
15 these -- I guess -- I am missing
16 something.

17 Can you tell me -- can you
18 repeat your question?

19 BY MS. STERLING:

20 Q We have a sub-stem for human
21 that's -u.

22 A That's right.

23 Q Is that -u or is it -za?

24 MR. DIAMOND: Objection to
25 form.

1 ARTURO CASADEVALL, MD, PhD

2 THE WITNESS: A what?

3 BY MS. STERLING:

4 Q -za?

5 A What is Zed-A?

6 Q The two letters Zed-A -- in
7 American Z-A, I guess.

8 MR. DIAMOND: Can you ask
9 the question again.

10 MS. STERLING: That was the
11 answer, What is -za? I answered
12 his question.

13 MR. DIAMOND: You
14 answered --

15 BY MS. STERLING:

16 Q Do you understand what I am
17 saying when I say the letters Zed-A?

18 A No, I actually don't
19 understand your question.

20 Q Do you understand what I am
21 saying when I say the term, the
22 letters Zed-A?

23 A Zed-A?

24 Q Yes.

25 A Like Z-A?

1 ARTURO CASADEVALL, MD, PhD

2 Q Yes.

3 A Well, there is no letter
4 called Zed. There is a letter called
5 Z.

6 Q I'm sorry, in my country
7 there is. Let me try to translate to
8 American.

9 Z-A --

10 A Z-A.

11 MR. DIAMOND: Wait. What is
12 the question?

13 BY MS. STERLING:

14 Q Are you comfortable with Z
15 than Zed?

16 A I don't -- I did not what
17 Zed means.

18 Q Okay.

19 So you will have to agree
20 with me -- I am just going to tell
21 you, where I come from Zed is the
22 equivalent of Z here in America. So I
23 will use the American version of Z for
24 this question.

25 In this list of sub-stems,

1 ARTURO CASADEVALL, MD, PhD

2 do you see the letters -za as a
3 sub-stem?

4 A I do not see the letters
5 -za.

6 Q Okay.

7 And to be clear, when I was
8 asking you about -zu you could
9 understand that I was talking about
10 the humanized -zu here?

11 A -zu stands for humanized.

12 Q Okay.

13 MR. DIAMOND: We have been
14 going about an hour now.

15 MS. STERLING: I was going
16 to say it's a good time for a
17 break before we launch to a new
18 topic. Ten minutes, please.

19 MR. DIAMOND: More or less.

20 (Whereupon a Recess
21 Commenced at 10:53 a.m. and
22 Testimony Recommenced at 11:20
23 a.m.)

24 MS. STERLING: Back on the
25 record.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q Dr. Casadevall, did you talk
4 to your counsel about the substance of
5 your deposition testimony during the
6 break?

7 A No.

8 Q In your declaration, let's
9 turn to pages 58 to 60. And we are
10 still on the '504 declaration until I
11 tell you otherwise.

12 A (Reviewing.)

13 Q So on these pages you
14 include Table 1 which is references to
15 eculizumab as Thomas's humanized IgG4
16 antibody.

17 Do you see where we are?

18 A Yes.

19 Q I would like to discuss a
20 couple of papers in this table that
21 you refer to.

22 I am going to hand you
23 what's been previously marked as
24 AMG1005, that's the Bell reference.
25 It's the top row of the table on page

1 ARTURO CASADEVALL, MD, PhD

2 59.

3 A (Reviewing.)

4 Q So it is a published patent
5 application and it lists Leonard Bell
6 as the first inventor and Russell
7 Rother as the second inventor on the
8 face page.

9 Do you see that?

10 MR. DIAMOND: Objection to
11 form.

12 BY MS. STERLING:

13 Q Do you need me to repeat the
14 question?

15 A Please.

16 Q Okay.

17 This document AMG1005, it's
18 a published patent application and it
19 lists tow inventors; the first one is
20 Leonard Bell, the second one is
21 Russell Rother on the first page?

22 Do you see that?

23 A Yes.

24 Q Do you still have your copy
25 of the '504 patent that I gave you

1 ARTURO CASADEVALL, MD, PhD

2 earlier?

3 A (Reviewing.) I have it.

4 Q Okay. Good.

5 Do you see the inventors
6 listed on the first page of the '504
7 patent?

8 A Leonard Bell, Russell
9 Rother, and Mark Evans.

10 Q Leonard Bell and Russell P.
11 Rother are overlapping inventors
12 between this Bell publication and the
13 '504 patent, correct?

14 MR. DIAMOND: Objection to
15 form.

16 THE WITNESS: (Reviewing.)
17 Leonard Bell and Russell Rother
18 are listed as inventors in both
19 applications.

20 BY MS. STERLING:

21 Q Okay.

22 I am going to call this
23 Exhibit 1005 Bell for our discussion,
24 okay?

25 Do you recognize Bell?

1 ARTURO CASADEVALL, MD, PhD

2 A I recognize Bell.

3 Q You relied on it in your
4 declaration, correct?

5 A I relied on it in my
6 declaration.

7 Q Okay.

8 So you are familiar with
9 Bell?

10 A I am familiar with Bell, I
11 read it.

12 Q When was the last time you
13 read it?

14 A Within the past month.

15 Q Do you know Leonard Bell?

16 A No.

17 Q Do you know Russell Rother?

18 A No.

19 Q Okay.

20 In your table, you point
21 to -- again, I am on your table in
22 your declaration, on page 59, the top
23 column -- top row is your entry for
24 Bell.

25 Do you see that?

1 ARTURO CASADEVALL, MD, PhD

2 A I see that.

3 Q You cite to Bell on
4 paragraph 0052. It's in your
5 left-hand column.

6 Do you see, "You say Bell
7 AMG1005 at paragraph 0052."

8 A Okay.

9 Q Let's go to that paragraph.
10 So that paragraph, if you
11 look at the top of the page, it's on
12 page 5 --

13 MR. DIAMOND: So --

14 MS. STERLING: We are in
15 Bell, Dr. Casadevall.

16 MR. DIAMOND: Are you asking
17 about paragraph 52 in Bell?

18 MS. STERLING: Yes.

19 THE WITNESS: Yes, I am
20 sorry.

21 MR. DIAMOND: You're asking
22 him to turn to 52 in Bell.

23 MS. STERLING: I can
24 instruct the witness like you,
25 Evan.

1 ARTURO CASADEVALL, MD, PhD

2 MR. DIAMOND: He was
3 confused.

4 MS. STERLING: Evan, it's my
5 deposition.

6 MR. DIAMOND: Take all the
7 time you need to do that, I
8 suppose.

9 BY MS. STERLING:

10 Q Dr. Casadevall, are you
11 looking at the Bell reference,
12 AMG1005?

13 A I am looking at the Bell
14 reference.

15 Q Can you turn to paragraph
16 52.

17 A I am now in paragraph 52.

18 Q Okay.

19 It's a pretty lengthy
20 paragraph but you have provided us an
21 excerpt from that paragraph in your
22 table in the right-hand column.
23 Correct?

24 A Yes.

25 Q Okay.

1 ARTURO CASADEVALL, MD, PhD

2 So in that excerpt that you
3 have given us, it talks about methods
4 for the preparation of h5G1.1-mAb,
5 h5G1.1 scFv and other functional
6 fragments of h5G1.1. And it says that
7 methods for the preparation were
8 described in US patent number
9 6,355,245. And you inserted Thomas
10 here, just a shorthand for the full
11 quote that's provided in patent 52.

12 Is that fair?

13 MR. DIAMOND: Objection to
14 the form.

15 BY MS. STERLING:

16 Q Did you not insert Thomas
17 here in square brackets to replace the
18 full-length cite?

19 MR. DIAMOND: Are you
20 withdrawing the prior question or
21 is that the new question?

22 BY MS. STERLING:

23 Q Did you insert Thomas in
24 square brackets here to replace the
25 full cite that's provided in paragraph

1 ARTURO CASADEVALL, MD, PhD

2 52 of AMG1005?

3 A Let me find it.

4 (Reviewing.)

5 Q If it's helpful, it's at the
6 top of the right-hand column. You
7 will see your sentence bridging.

8 A Top of the right hand.

9 Q Starts at the very bottom of
10 the left-hand column and bridges over
11 to the right-hand column.

12 A Method for the
13 preparation --

14 Q Yep.

15 A -- of h5G1.1 monoclonal
16 antibody h5G1.1 scFv and other
17 functional fragments of h5G1.1 are
18 described in US patent number
19 6,355,245 and inhibition of complement
20 activity by humanized anti-C5 antibody
21 and single chain FB Thomas, et al,
22 Molecular Immunology Volume 33 Number
23 17/18, pages 1389 and 1401, 1996.

24 Q Last sentence in that
25 paragraph says, "The antibody

1 ARTURO CASADEVALL, MD, PhD
2 h5G1.1-mAb is currently undergoing
3 trade name eculizumab."

4 Do you see that?

5 A "The antibody h5G1.1-mAb
6 currently undergoing clinical trials
7 than the trade name eculizumab."

8 Q So when you repeat the
9 sentence I just read to you, is that
10 you agreeing that you see the sentence
11 there?

12 I want to be clear that's
13 what your answer means.

14 MR. DIAMOND: Objection to
15 the form.

16 THE WITNESS: I am reading
17 the text of the question because I
18 want to be accurate.

19 BY MS. STERLING:

20 Q I understand that.

21 But when I ask you do you
22 see that sentence there, and you read
23 it back to me, is that your
24 acknowledging that sentence is there?

25 MR. DIAMOND: Objection to

1 ARTURO CASADEVALL, MD, PhD
2 the form mischaracterizes the
3 witness' testimony.

4 THE WITNESS: When I read
5 you back the sentence it is
6 exactly what is stated there. And
7 those are the words, last sentence
8 of paragraph 52.

9 BY MS. STERLING:

10 Q Okay.

11 So based on the sentence and
12 person of ordinary skill in the art
13 reading this sentence, would they
14 associate the term h5G1.1-mAb with the
15 tradename eculizumab?

16 MR. DIAMOND: Objection to
17 form.

18 THE WITNESS: What a person
19 would associate would be the
20 earlier reference to Thomas
21 because that is the context by
22 which you read that sentence.

23 BY MS. STERLING:

24 Q So you're telling me based
25 on this sentence a person of ordinary

1 ARTURO CASADEVALL, MD, PhD
2 skill in the art would not associate
3 the term h5G1.1-mAb with the tradename
4 eculizumab?

5 A A POSA at the time would
6 associate h5G1.1 with the earlier
7 reference that cites Thomas and with
8 the tradename eculizumab.

9 Q Okay. Let's look at the
10 document Brekke, that's in the bottom
11 row of that column on that table we
12 are looking at on page 59. I am going
13 to get you that document.

14 I am handing you what's been
15 previously marked AMG1019. It's
16 entitled, Therapeutic Antibodies for
17 Human Diseases at the Dawn of
18 Twenty-First Century, and lists first
19 author Ole Henrik Brekke.

20 Do you see that?

21 A Yes (Reviewing.)

22 Q I am going to call this
23 document Exhibit 1019 Brekke for our
24 discussion, okay.

25 This is the same Brekke that

1 ARTURO CASADEVALL, MD, PhD
2 you cited to in your table on page 59?

3 A (Reviewing.) Yes, it is the
4 2003 reference.

5 Q Okay.
6 Do you recognize this
7 article?

8 A Yes.

9 Q When was the last time you
10 reviewed Brekke?

11 A Within the past month.

12 Q Okay.
13 Do you know Ole Henrik
14 Brekke?

15 A No.

16 Q In your table in the
17 left-hand column, you point us to
18 Brekke AMG1019, page 56.

19 Do you see that?

20 A I'm sorry, Brekke at 56?

21 Q Yes.

22 Let's turn to Brekke
23 Exhibit 1019, page 56.

24 A We are on page 56?

25 Q Yes. That is the page you

1 ARTURO CASADEVALL, MD, PhD

2 cite us to -- you direct us to,
3 correct?

4 A Right (Reviewing).

5 Q We are on page 56 of Brekke,
6 Dr. Casadevall.

7 A Oh.

8 Q And you can turn back in
9 your declaration to the table that we
10 are looking at on page 59.

11 A I'm sorry, I'm confused.

12 Q Yes, I can see that. Let's
13 start again.

14 We are looking at your
15 declaration on page 59.

16 A Yes.

17 Q There's the last entry on
18 that page, you point us to Brekke at
19 page 56.

20 A Yes.

21 Q So keep your declaration
22 open there.

23 And let's now turn to Brekke
24 page 56 where you point us to.

25 A I'm sorry, counsel. I am

1 ARTURO CASADEVALL, MD, PhD
2 confused, because Brekke doesn't have
3 a page 56, unless you want --

4 Q I can see page numbers here
5 on the bottom left-hand corner.

6 A I am so sorry. I was
7 looking at the --

8 Q Understood.

9 A At the 1 on the bottom.
10 Okay. 56 (Reviewing).

11 Q So I believe your quote that
12 you point us to in your table on page
13 59, comes from somewhere close to the
14 bottom of the left-hand column on that
15 page 56. It's one, two, three, four,
16 five, six, seven lines up.

17 A (Reviewing.) I see.

18 Q And it starts, Eculizumab
19 (5G1.1).

20 Do you see that sentence?

21 A I see that sentence.

22 Q Okay. That is the quote
23 that you have taken from Brekke and
24 provided in your table on page 59 in
25 your declaration, correct?

1 ARTURO CASADEVALL, MD, PhD

2 A (Reviewing.) Eculizumab 5G1

3 Alexion Pharmaceuticals -- it's a
4 humanized monoclonal antibody that
5 prevents the cleavage of human
6 complement component C5 into its
7 pro-inflammatory component.

8 Yes, that is the quote.

9 Reference 31.

10 Q So Brekke, in this quote,
11 discusses eculizumab and in
12 parenthesis afterwards provides us
13 with 5G1.1 Alexion Pharmaceuticals,
14 correct?

15 A In this quote -- in this
16 quote has eculizumab followed by 5G1.1
17 Alexion Pharmaceuticals.

18 Q So a person of ordinary
19 skill in the art reading this would
20 associate eculizumab with 5G1.1 from
21 Alexion Pharmaceuticals, correct?

22 MR. DIAMOND: Objection to
23 form.

24 THE WITNESS: A POSA reading
25 this in the year 2003, would have

1 ARTURO CASADEVALL, MD, PhD
2 gone to reference 31, to
3 understand what this antibody is.

4 BY MS. STERLING:

5 Q How about in the year 2007?

6 You said 2003. I just want
7 to be clear we are talking --

8 A The paper was 2003.

9 Q Okay.

10 So a person of ordinary
11 skill in the art reading this in
12 2003 --

13 A So any POSA prior to
14 March 15, 2007, reading this article
15 will have concluded that the -- that
16 the identity of this needs to go to
17 reference 31 which is Thomas.

18 Q But they would also
19 understand that eculizumab is
20 associated with the term 5G1.1,
21 correct?

22 MR. DIAMOND: Objection to
23 form.

24 THE WITNESS: I don't think
25 they would have understand that.

1 ARTURO CASADEVALL, MD, PhD

2 When you read this, you go to the
3 authority. The authority in this
4 case is reference 31.

5 BY MS. STERLING:

6 Q So you're telling me no one
7 would associate, before March 2007,
8 the word eculizumab with nomenclature
9 of 5G1.1?

10 MR. DIAMOND: Objection to
11 form. Asked and answered.

12 THE WITNESS: You're asking
13 me about nobody. I have no way of
14 knowing who is nobody.

15 BY MS. STERLING:

16 Q You're telling me a person
17 of ordinary skill in the art would not
18 have associated the word eculizumab
19 with the name 5G1.1 prior to
20 March 2007.

21 Is that what you are telling
22 me?

23 A What I am saying is a POSA
24 would have read this reference --
25 would have read this sentence and if

1 ARTURO CASADEVALL, MD, PhD
2 it was interested in eculizumab, would
3 have gone to 31.

4 Q But based on your testimony
5 I am trying to understand you, are you
6 saying they would not have associated
7 eculizumab with 5G1.1?

8 A What I am saying is that
9 they would have gone to the reference
10 because that is the authoritative part
11 of the sentence.

12 Q You won't even -- so you're
13 telling me they would ignore the
14 parenthesis after the word eculizumab
15 and go straight to Thomas?

16 Is that what you are saying?

17 MR. DIAMOND: Hold on. Let
18 her finish the question.
19 Objection to form.

20 THE WITNESS: I am not
21 saying that they would ignore my
22 question. I am saying that a POSA
23 at the time would have gone back
24 to the reference to try to
25 understand what eculizumab is.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q But would they have
4 associated the term "eculizumab" with
5 5G1.1?

6 MR. DIAMOND: Objection to
7 form. Asked and answered.

8 THE WITNESS: I don't -- I
9 think they would have gone back to
10 the -- this is a review article.
11 This is a secondary source. You
12 go back to the primary source.
13 The primary source is Thomas.

14 BY MS. STERLING:

15 Q You can't tell me, sitting
16 here today, that a person of ordinary
17 skill in the art would have associated
18 the word eculizumab with 5G1.1?

19 MR. DIAMOND: Objection to
20 form. Asked and answered.

21 THE WITNESS: I think your
22 question is too broad.

23 BY MS. STERLING:

24 Q I am looking at the sentence
25 that says eculizumab (5G1.1).

1 ARTURO CASADEVALL, MD, PhD

2 A I think a POSA at the time
3 would have read the sentence, would
4 have seen 5G1, would not know what
5 that means, and would go straight into
6 31 to try to understand what
7 eculizumab is.

8 Q So you're telling me a
9 person of ordinary skill in the art
10 would not have understood that 5G1.1
11 was associated with eculizumab?

12 A I think they would have seen
13 that number. But to make a
14 conclusion, especially when the source
15 is a secondary reference, you go to
16 the primary literature, and the
17 primary literature is Thomas.

18 Q Okay.

19 Let's look back at your
20 table in your declaration, page 58.
21 You have several entries in your table
22 as well. The first one is a reference
23 Hillmen 2004 and it's AMG 1074.

24 Do you see that entry in the
25 first row?

1 ARTURO CASADEVALL, MD, PhD

2 A I see that entry.

3 Q I am going to hand you
4 what's been previously marked as
5 Exhibit 1004.

6 That document is a journal
7 article entitled, Effect of Eculizumab
8 on Hemolysis and Transfusion
9 Requirements in Patients with
10 Paroxysmal Nocturnal Hemoglobinuria.
11 And it lists first author Peter
12 Hillmen.

13 A I see that.

14 Q I am going to refer to
15 Exhibit 1004 as Hillmen, just for
16 purposes of this discussion, okay?

17 A Yes.

18 Q Do you recognize Hillmen?

19 A I recognize Hillmen.

20 Q And you rely on it in your
21 declaration at page 58, correct?

22 A I relied on it in my
23 declaration on page 58.

24 Q You are familiar with
25 Hillmen?

1 ARTURO CASADEVALL, MD, PhD

2 A I am familiar with Hillmen.

3 Q When was the last time you
4 reviewed Hillmen?

5 A Within the past month.

6 Q Do you know Peter Hillmen,
7 the first listed author?

8 A No.

9 Q Do you know any of the
10 authors listed here?

11 A Claire Hall, Judy Marsh,
12 Modupe Elebute, Michael Bombara, Beth
13 Petro, Matthew Cullen, Stephen
14 Richards, Scott Rollins, Christopher
15 Mojcik and Russell Rother.

16 No, I do not know any of
17 these authors.

18 Q So back to your table in
19 your declaration, you point us to
20 Hillmen at page 553 in your
21 declaration.

22 A Yes.

23 Q Let's turn to page 553 in
24 Hillmen and AMG1004.

25 And I believe the quote that

1 ARTURO CASADEVALL, MD, PhD
2 you have in your table in your
3 declaration comes from the left-hand
4 column of that page, and roughly about
5 two-thirds down there's a paragraph
6 that starts, "Eculizumab is a
7 recombinant humanized monoclonal
8 antibody."

9 Do you see the paragraph?

10 A I see the paragraph,
11 "Eculizumab is a recombinant humanized
12 monoclonal antibody that was designed
13 to block the activation of terminal
14 complement components."

15 And it gives references 14
16 and 15.

17 Q And based on your
18 declaration -- and you can confirm
19 this in the document -- reference 15
20 is the Thomas document you keep
21 referring to, correct?

22 A Reference 15 -- reference 15
23 is the Thomas document.

24 Q Okay.

25 While you're on that page

1 ARTURO CASADEVALL, MD, PhD
2 that you are on, I believe you're
3 looking at page 559 for the listing of
4 references, correct?

5 A I am looking at page 559.

6 Q Okay.

7 Can you see at the end of
8 the text of the reference there's a
9 box of smaller text on the right-hand
10 column on that page?

11 MR. DIAMOND: A box?

12 MS. STERLING: An excerpt, a
13 chunk of text.

14 THE WITNESS: You mean up
15 here?

16 BY MS. STERLING:

17 Q Yes.

18 A I see the text -- I see the
19 text.

20 Q Okay.

21 We see here that text reads,
22 Funded by Alexion Pharmaceuticals,"
23 correct?

24 A I see that the study was
25 funded by Alexion Pharmaceuticals.

1 ARTURO CASADEVALL, MD, PhD

2 Q You see in the next
3 paragraph, Dr. Hillmen reports serving
4 as consultant to Alexion
5 Pharmaceuticals, correct -- and
6 receiving grant support from the
7 company, correct?

8 A The text says, "Dr. Hillmen
9 reports serving as consultant to
10 Alexion Pharmaceuticals and receiving
11 grant support from the company."

12 Q You know to save time of me
13 reading it and then you reading it,
14 why don't you read that paragraph into
15 the record for us.

16 A Happy to.

17 "Drs. Rollins, Mojcik and
18 Rother, Mr. Bombara and Ms. Petro
19 report having equity ownership in
20 Alexion Pharmaceuticals. And Dr.
21 Rollins and Rother have assigned to
22 Alexion Pharmaceuticals their
23 inventions made as employees of the
24 company and have received no royalties
25 from Alexion for these inventions.

1 ARTURO CASADEVALL, MD, PhD
2 Dr. Rollins receives royalties for
3 inventions that he made before
4 becoming an employee of Alexion."

5 Q So based on this paragraph
6 or these two paragraphs, is it fair to
7 say that Alexion is associated with
8 this publication?

9 MR. DIAMOND: Objection to
10 form.

11 THE WITNESS: My reading of
12 this paragraph is that Alexion
13 funded the study.

14 BY MS. STERLING:

15 Q And you don't take away from
16 the second paragraph that certain
17 authors are employees of Alexion?

18 MR. DIAMOND: Objection to
19 the form.

20 THE WITNESS: The paragraph
21 states -- it has a lot of details,
22 and this has to be parsed, but I
23 will not draw conclusions hear
24 except that the study was funded
25 by Alexion Pharmaceuticals.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q Okay.

4 Would you agree that Dr.
5 Hillmen serves as consultant or
6 reports serving as a consultant to
7 Alexion Pharmaceuticals, correct?

8 MR. DIAMOND: Objection to
9 form.

10 THE WITNESS: The statement
11 reports Dr. Hillmen reports
12 serving as a consultant to Alexion
13 Pharmaceuticals. But the way that
14 it is written, it could have been
15 in the past, could have been in
16 the present; you can't get much
17 out of that.

18 BY MS. STERLING:

19 Q Okay.

20 You don't consider "serving"
21 as present term?

22 MR. DIAMOND: Objection to
23 the form.

24 THE WITNESS: I read it as
25 "report serving." "Report

1 ARTURO CASADEVALL, MD, PhD
2 serving" could be read as the
3 past.

4 BY MS. STERLING:

5 Q Okay.

6 It says, "Drs. Rollins,
7 Mojcik and Rother, Mr. Bombara and Ms.
8 Petro report having equity ownership
9 in Alexion Pharmaceuticals."

10 Would you read that as
11 present tense?

12 MR. DIAMOND: Objection to
13 form.

14 THE WITNESS: (Reviewing.)
15 I would -- "Drs. Rollins, Mojcik
16 and Rother, Mr. Bombara and Ms.
17 Petro report having equity
18 ownership in Alexion
19 Pharmaceuticals."

20 Again, it is vague whether
21 it is the present or the past.

22 BY MS. STERLING:

23 Q How about: "Doctors Rollins
24 and Rother have assigned to Alexion
25 Pharmaceuticals their inventions made

1 ARTURO CASADEVALL, MD, PhD
2 as employees of the company."

3 Would that connote to you
4 that Doctors Rollins and Rother either
5 are or were at this point Alexion
6 Pharmaceutical employees?

7 MR. DIAMOND: Objection to
8 form.

9 THE WITNESS: All I can get
10 from this is that Dr. Rollins and
11 Rother have assigned to Alexion
12 Pharmaceuticals inventions made as
13 employees of the company and have
14 received no royalties from Alexion
15 for these inventions.

16 BY MS. STERLING:

17 Q Okay.

18 On the first page, on the
19 left-hand side there's a box or a
20 paragraph an excerpt of text.

21 Do you see that?

22 A This one?

23 Q Yes.

24 Tells you the papers from
25 certain places.

1 ARTURO CASADEVALL, MD, PhD

2 A Right.

3 Q One of those places is
4 Alexion Pharmaceuticals, Cheshire,
5 Connecticut. That's about halfway
6 through the paragraph.

7 Do you see that?

8 MR. DIAMOND: Objection to
9 form.

10 THE WITNESS: (Reviewing.)

11 Can you repeat your question.

12 BY MS. STERLING:

13 Q We are looking at this
14 paragraph of text on the left-hand
15 side on the first page of the paper
16 together, correct?

17 A Correct.

18 Q Okay.

19 That paragraph starts with
20 from -- it tells you who the paper is
21 from, and there are a list of various
22 entities. About halfway down that
23 paragraph, one entity listed is
24 Alexion Pharmaceuticals in Cheshire,
25 Connecticut.

1 ARTURO CASADEVALL, MD, PhD

2 Do you see that?

3 MR. DIAMOND: Objection to
4 form. Compound.

5 THE WITNESS: Alexion
6 Pharmaceuticals, Cheshire
7 Connecticut is listed in the box.

8 BY MS. STERLING:

9 Q Okay.

10 Would that have informed a
11 person of ordinary skill in the art
12 that Alexion was associated with this
13 paper?

14 MR. DIAMOND: Objection to
15 the form.

16 THE WITNESS: It would have
17 only -- it would have only
18 informed someone in the art that
19 those people, MPB, BEP, SAR, CFM,
20 RPR, are associated in some way
21 with Alexion.

22 BY MS. STERLING:

23 Q Okay.

24 Those people, based on those
25 initials, if we look at the authors,

1 ARTURO CASADEVALL, MD, PhD
2 MPB, would it be fair to conclude that
3 is Michael P. Bombara?

4 A Since that is the only set
5 of initials that fits, I would agree
6 that's Michael P. Bombara.

7 Q Okay.

8 BEP, those initials, would
9 we conclude that's Beth E. Petro?

10 A Yes.

11 Q SAR. Would a person reading
12 this conclude that could be Scott A.
13 Rollins?

14 A Would be Scott A. Rollins,
15 the only initial that's match.

16 Q Okay. The initials CFM,
17 would a person reading this paper
18 conclude that was Christopher F.
19 Mojcik?

20 A Christopher F. Mojcik is the
21 only initials that match CFM.

22 Q And then RPR, the last set
23 of initials, would you agree a person
24 of ordinary skill in the art reading
25 this would have associated those

1 ARTURO CASADEVALL, MD, PhD
2 initials with Russell P. Rother?

3 A Russell P. Rother would be
4 associated with RPR.

5 Q Okay.

6 So based on this, we can
7 conclude that those authors are with
8 Alexion Pharmaceuticals in Cheshire,
9 Connecticut; is that fair?

10 MR. DIAMOND: Objection to
11 form.

12 THE WITNESS: I don't think
13 you can conclude that. These
14 individuals may have left the
15 company. This work -- this work
16 reflects work that was done. You
17 cannot conclude anything about
18 dates from looking at that.

19 BY MS. STERLING:

20 Q But Alexion Pharmaceuticals
21 is associated with these names in this
22 paper, correct?

23 MR. DIAMOND: Objection to
24 form.

25 THE WITNESS: Alexion

1 ARTURO CASADEVALL, MD, PhD
2 Pharmaceuticals is associated with
3 these names in this paper but it
4 doesn't tell you anything about
5 dates.

6 BY MS. STERLING:

7 Q Let's -- this was published
8 in 2004, correct?

9 A It was published in 2004.

10 Q Okay.

11 And in 2004, this listing of
12 authors in the paragraph that tells
13 you where those authors are from,
14 multiple authors are listed as being
15 from Alexion Pharmaceuticals.

16 Would you agree with that?

17 A I don't agree that they are
18 listed as being from Alexion
19 Pharmaceuticals. They are listed with
20 Alexion Pharmaceuticals, but I -- in
21 2004, these individuals could have
22 left the company. This could reflect
23 the past.

24 I don't think you can make
25 any conclusion regarding what the

1 ARTURO CASADEVALL, MD, PhD
2 association was on February 5, 2004.

3 Q Okay.

4 So then we are saying
5 Hillmen 2004 is not associated with
6 Alexion; that's your conclusion?

7 MR. DIAMOND: Objection to
8 form.

9 THE WITNESS: I did not say
10 that. What I said was that you
11 cannot -- that you cannot make an
12 association with time. So you
13 don't know from that heading
14 whether they are associated with
15 the company at that time.

16 BY MS. STERLING:

17 Q So you're telling me based
18 on this paragraph that we have looked
19 at on page 1, and the repeated
20 mentions of Alexion -- I'm sorry, page
21 1. Let me be clearer.

22 The document page 552 of the
23 reference, so this paragraph that we
24 looked at on page 552 and the repeated
25 mentions of Alexion in the paragraph

1 ARTURO CASADEVALL, MD, PhD
2 we looked at 559, you're telling me a
3 person of ordinary skill in the art
4 would still not associate this paper
5 with Alexion Pharmaceuticals?

6 MR. DIAMOND: Objection to
7 form.

8 THE WITNESS: I am saying
9 that based on what we have read
10 that this study is funded by
11 Alexion; these people have some
12 association -- these people are
13 associated in a sentence with
14 Alexion but you cannot infer that
15 this is -- at what time this
16 happened, whether it's a
17 concurrent, the past or the past.

18 BY MS. STERLING:

19 Q Is it common when you're
20 reciting where work comes from with
21 multiple groups that you would
22 recite authors no longer associated
23 with that group, still associated with
24 that group?

25 MR. DIAMOND: Objection to

1 ARTURO CASADEVALL, MD, PhD
2 form. I am also going to object
3 to this entire line outside the
4 scope of the direct testimony. I
5 don't know what this relates to.

6 THE WITNESS: I will answer
7 as follows with my own experience.

8 BY MS. STERLING:

9 Q Okay.

10 A I was arborized in College
11 of Medicine up to 2015. Since then, I
12 have been at Johns Hopkins.

13 Work that traces in some
14 ways to people who are associated with
15 Einstein, may be published in the year
16 2-20. But those people may no longer
17 be there.

18 So the bottom line is, what
19 you have is names associated with a
20 company. You cannot infer the
21 relationship from looking at that.

22 MR. DIAMOND: Counsel,
23 before you continue this line of
24 questioning, maybe we want to take
25 a break and you can explain it.

1 ARTURO CASADEVALL, MD, PhD

2 Can you explain how this is
3 within the scope or relates to the
4 scope of the direct testimony per
5 the PTAB rules?

6 MS. STERLING: This is a
7 document that your witness has
8 relied on. I am trying to
9 understand his take on the
10 document.

11 MR. DIAMOND: This is a
12 document you introduced. I just
13 don't understand what -- I mean,
14 happy to take a break and you can
15 explain to me. I want to make
16 sure if I have an objection or
17 not, and maybe there's not. If
18 you can explain to me, but I don't
19 understand.

20 MS. STERLING: I am trying
21 to understand the information a
22 person of ordinary skill in the
23 art would have taken away from
24 this document that Dr. Casadevall
25 relies in his declaration and

1 ARTURO CASADEVALL, MD, PhD
2 quotes from.

3 MR. DIAMOND: I still don't
4 understand how --

5 MS. STERLING: You don't
6 have to understand my questions,
7 Evan.

8 MR. DIAMOND: Let me put it
9 this way. I am going to maintain
10 an objection to this entire line
11 of questioning and reserve the
12 right to strike it as outside the
13 scope of the direct testimony
14 without counsel providing any
15 further explanation.

16 I will be happy, if you can
17 provide some explanation on the
18 record or at a break and maybe
19 convince me otherwise. But right
20 now I don't see how any of this is
21 within the scope of anything
22 that's at issue from either party.

23 MS. STERLING: Not your --

24 MR. DIAMOND: Particularly
25 the line of questioning regarding

1 ARTURO CASADEVALL, MD, PhD
2 which authors are from where. But
3 again, if you can explain it, I'm
4 happy to reconsider that.

5 MS. STERLING: Now you're
6 done with that particularly
7 lengthy speaking objection.

8 MR. DIAMOND: It's not a
9 speaking objection. It's actually
10 the rules and what allows you to
11 be here and ask questions or not
12 and I am happy to discuss that
13 further with you.

14 MS. STERLING: Sure.

15 BY MS. STERLING:

16 Q The next entry in your table
17 is Hill 2005, Exhibit AMG1047.

18 Do you see that?

19 A Hill 2005 Exhibit 1047 from
20 Amgen, I see that.

21 Q Okay.

22 I am going to hand you
23 what's been previously marked
24 Exhibit 1047.

25 A (Reviewing.)

1 ARTURO CASADEVALL, MD, PhD

2 Q This is a document entitled,
3 Sustained response and long-term
4 safety of eculizumab in paroxysmal
5 nocturnal hemoglobinuria, with first
6 author Anita Hill.

7 Do you see that?

8 A I see that.

9 Q So at the very bottom of
10 this page, in the left-hand column,
11 under the line, the last paragraph
12 says, "Several of the authors (JC,
13 CFM, RPR) are employed by Alexion."

14 Do you see that?

15 A (Reviewing.) "Several of
16 the authors (JC, CFM, and RPR) are
17 employed by Alexion."

18 MR. DIAMOND: Again, I am
19 going to object to this line of
20 questioning as to who and who
21 wasn't employed by Alexion as
22 outside the scope of direct
23 testimony, pending any explanation
24 from counsel for Amgen otherwise,
25 and of course, reserve the right

1 ARTURO CASADEVALL, MD, PhD
2 to object to any use of this
3 testimony and replies or anything
4 else as outside the scope of
5 anything that Amgen introduced in
6 its petition.

7 Again, if you have something
8 else to say about that, I will be
9 happy to hear it.

10 BY MS. STERLING:

11 Q Author CRM, would you agree
12 that would be Christopher F. Mojcik?

13 A Christopher M. Mojcik
14 matches the initials CFM.

15 Q You said Christopher M.
16 Mojcik.

17 A F -- Christopher F. Mojcik
18 matches initials CFM.

19 Q Okay.

20 And RPR, do those initials
21 match author Russell P. Rother?

22 A RPR matches Russell P.
23 Rother.

24 Q Okay.

25 So this document tells you

1 ARTURO CASADEVALL, MD, PhD
2 at the bottom of the page was
3 published October 2005, correct?

4 A It was published in
5 October 2005.

6 Q Okay.
7 It says in present tense,
8 Several of the authors are employed by
9 Alexion.

10 Do you see that?

11 MR. DIAMOND: Same objection
12 regarding to the scope of the
13 direct testimony.

14 MS. STERLING: Understood.

15 THE WITNESS: It says that
16 the date is October 2005. It
17 says, in the present tense, are
18 employed by Alexion. But that
19 date may not reflect that
20 paragraph because this paper was
21 submitted for publication on
22 May 25, 2005 -- submitted, no, on
23 February 9, 2005.

24 And so we don't know how
25 that statement which uses the

1 ARTURO CASADEVALL, MD, PhD
2 present term "are," relates to
3 October 1st, 2005, or to the
4 February 9, 2005.

5 BY MS. STERLING:

6 Q So you would say -- do you
7 read your articles before they are
8 submitted if you are an author?

9 MR. DIAMOND: Objection to
10 form. You are asking about this
11 article?

12 MS. STERLING: No. I am
13 asking about his own articles.
14 That's why I said, do you read
15 your articles. Listen to the
16 question, Evan.

17 BY MS. STERLING:

18 Q Dr. Casadevall, when you
19 write an article, do you read it
20 before you submit it?

21 MR. DIAMOND: Objection to
22 the form and generally outside the
23 scope of the direct testimony. I
24 mean, that question.

25 THE WITNESS: Every paper

1 ARTURO CASADEVALL, MD, PhD
2 that have been submitted under my
3 name is read by me. But there is
4 often a huge difference between
5 when I read it and publication,
6 depending on the review process,
7 depending how long it take to do
8 it.

9 BY MS. STERLING:

10 Q So based on that, this paper
11 was submitted on February 9, 2005.

12 You would agree with that?

13 MR. DIAMOND: Objection to
14 the form.

15 BY MS. STERLING:

16 Q You have already testified
17 to that, correct?

18 A It was submitted -- states
19 here it was submitted February 9,
20 2005.

21 Q Okay.

22 So at least at February 9,
23 2005, several of the authors were
24 employees of Alexion, correct?

25 MR. DIAMOND: Objection to

1 ARTURO CASADEVALL, MD, PhD

2 form. Objection to scope.

3 THE WITNESS: I don't think
4 you can conclude that. You don't
5 know when several of the authors
6 are employed by Alexion was
7 written.

8 BY MS. STERLING:

9 Q Okay.

10 It has to have been written
11 sometime before October 2005 when the
12 paper was published, correct?

13 I mean, it can't be added to
14 the paper after it's published?

15 MR. DIAMOND: Allow counsel
16 to finish her question which I
17 didn't hear now.

18 Can you say the question
19 again.

20 MS. STERLING: You have
21 realtime in front of you.

22 MR. DIAMOND: I couldn't
23 hear the question. He cut you
24 off. I want to make sure the
25 witness doesn't speak over your

1 ARTURO CASADEVALL, MD, PhD

2 question.

3 MS. STERLING: Evan, leave
4 us alone.

5 MR. DIAMOND: Ask your
6 question.

7 MS. STERLING: I have
8 already asked the question. You
9 keep interrupting like this, I
10 told you we will call the board
11 and we will.

12 MR. DIAMOND: We can talk
13 about the scope, too.

14 MS. STERLING: Happy to.

15 Could you read the question
16 back to the witness, please.

17 (Whereupon the Question is
18 Read Back.)

19 THE REPORTER: I mean, it
20 can't be added to the paper after
21 it's published?

22 MR. DIAMOND: Objection to
23 form.

24 BY MS. STERLING:

25 Q I am just going to -- that

1 ARTURO CASADEVALL, MD, PhD

2 wasn't the full question.

3 A When things are printed, at
4 the time of printing it appears you
5 cannot add it on that. But you can
6 always add a correction later on or
7 something like that.

8 Q Is there an indication on
9 this paper that there was a correction
10 made?

11 A You would not know from this
12 paper.

13 Q You're telling me once a
14 paper is published if it's updated or
15 modified, that's not noted anywhere?

16 MR. DIAMOND: Objection to
17 form.

18 THE WITNESS: It depends.
19 Some -- some papers, for example,
20 PubMed, would have -- may have a
21 correction. So when you look at
22 the paper, they give you the
23 correction and the reference. But
24 I don't know what the practice was
25 in 2005, and some corrections may

1 ARTURO CASADEVALL, MD, PhD
2 not make it into PubMed. But, you
3 know...

4 BY MS. STERLING:

5 Q You cite all these papers in
6 this table that's on page 58 through
7 60, because these references either
8 cite to Thomas or they cite to the
9 document that, in turn, cites to
10 Thomas.

11 Is that fair?

12 MR. DIAMOND: To be clear, I
13 am no longer objecting to the
14 scope now that you are talking
15 about the declaration. So go on.

16 THE WITNESS: So as stated
17 in my declaration, all the
18 citations that are there are --
19 that are listed there cite to
20 Thomas.

21 BY MS. STERLING:

22 Q Okay.

23 I am going to hand you a
24 copy of Thomas previously marked as
25 Exhibit 1023.

1 ARTURO CASADEVALL, MD, PhD

2 A (Reviewing.)

3 Q Is this the same Thomas that
4 you refer to --

5 A This paper --

6 Q -- in your declaration?

7 A -- is the paper that I refer
8 to in my declaration.

9 Q Let's look at the abstract
10 of Thomas.

11 Thomas talks about --
12 multiple entries that have 5G1.1 in
13 them in the abstract.

14 Would you agree to that?

15 MR. DIAMOND: Objection to
16 form.

17 THE WITNESS: The
18 alphanumeric 5G1 appears multiple
19 times in the abstract.

20 BY MS. STERLING:

21 Q Okay.

22 So those examples are
23 5G1.1 --

24 MR. DIAMOND: Objection to
25 the form.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q I am not finished with the
4 question.

5 Those examples are 5G1.1,
6 h5G1.1 scFv, intact humanized h5G1.1,
7 humanized h5G1.1, murine 5G1.1.

8 Do you see those examples in
9 the abstract?

10 MR. DIAMOND: Objection to
11 the form.

12 THE WITNESS: I see the
13 things that you have read. I see
14 monoclonal antibody 5G1.1,
15 humanized 5G1.1, regions of 5G1.1,
16 humanized h5G1.1, humanized
17 h5G1.1, and murine 5G1.1.

18 BY MS. STERLING:

19 Q Does Thomas mention
20 eculizumab anywhere?

21 A Thomas does not mention
22 eculizumab anywhere.

23 MS. STERLING: Okay.

24 We are about to start a new
25 topic. Would it be a good time to

1 ARTURO CASADEVALL, MD, PhD
2 break for lunch, Dr. Casadevall,
3 or would you like to continue?

4 THE WITNESS: I am happy to
5 break.

6 MS. STERLING: Okay.

7 MR. DIAMOND: You want to do
8 the lunch break now?

9 MS. STERLING: (Nodding
10 Head).

11 (Whereupon a Recess
12 Commenced at 12:05 p.m. and
13 Testimony Recommenced at 12:56
14 p.m.)

15 MS. STERLING: Back on the
16 record.

17 BY MS. STERLING:

18 Q Dr. Casadevall, did you talk
19 about the substance of your deposition
20 with your counsel during the break?

21 A No.

22 Q You still have your
23 declaration in front of you for the
24 '504 patent?

25 A I have the declaration in

1 ARTURO CASADEVALL, MD, PhD

2 front of me.

3 Q Okay.

4 And let's go to paragraph
5 108, please.

6 A 108?

7 Q Yes.

8 So generally, in paragraphs
9 108 through paragraphs 118, you
10 discuss a series of publications that
11 address whether constant regions can
12 impact antigen binding properties; is
13 that fair?

14 Take a chance to look
15 through these paragraphs to see if
16 it's fair.

17 MR. DIAMOND: Objection to
18 form.

19 THE WITNESS: This section,
20 those paragraphs deal with changes
21 to amino acid sequences, including
22 in the constant region can
23 significantly impact the binding
24 safety and efficacy of therapeutic
25 antibodies.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q Okay.

4 I am going to hand you a
5 document that's been previously marked
6 as Exhibit 2013.

7 A (Reviewing.)

8 Q It's entitled, Isotype can
9 affect the fine specificity of an
10 antibody for a polysaccharide antigen;
11 and has first author Gary McLean.

12 Do you see that?

13 A I see the author.

14 Q I am going to refer to this
15 Exhibit 2013 as McLean for our
16 discussion, okay?

17 A Yes.

18 Q Do you recognize this paper?

19 A Hm?

20 Q Do you recognize this paper?

21 A This paper was published by
22 my laboratory.

23 Q Okay.

24 And you discuss this paper
25 in paragraph 109 of your declaration,

1 ARTURO CASADEVALL, MD, PhD

2 correct?

3 A Correct.

4 Q In paragraph 109 you stated
5 that, McLean reported comparing the
6 binding specificity of chimeric
7 antibodies, and then those antibodies
8 contain specific constant regions.
9 And you list them as IgA, IgG1, 2, 3,
10 4, and IgM.

11 Do you see that?

12 A Yes.

13 Q Okay.

14 Does McLean disclose any
15 experiments relating to testing a
16 human hybrid IgG2, IgG4 constant
17 region?

18 MR. DIAMOND: Objection to
19 form.

20 THE WITNESS: McLean reports
21 the testing of mouse-human
22 chimeric antibodies.

23 BY MS. STERLING:

24 Q Are any of those mice
25 chimeric -- sorry, which antibodies

1 ARTURO CASADEVALL, MD, PhD

2 did you say?

3 A McLean reports the testing
4 of mouse-human chimeric antibodies
5 based on the murine monoclonal
6 antibody 18B7.

7 Q Do any of those antibodies
8 tested in McLean have a human hybrid
9 IgG2-IgG4 constant region?

10 A None of those antibodies
11 have a hybrid IgG2-IgG4 constant
12 region.

13 Q Is it fair to say McLean
14 does not disclose any experiments
15 relating to testing an antibody that
16 has a human hybrid IgG2-IgG4 constant
17 region?

18 MR. DIAMOND: Objection to
19 form.

20 THE WITNESS: I disagree.
21 The message of McLean is that the
22 constant region can have an effect
23 on the specificity of an antibody;
24 therefore, it would imply that if
25 you change the constant region and

1 ARTURO CASADEVALL, MD, PhD
2 make it a hybrid, that you are
3 going to be -- you will not be
4 able to predict what happens.

5 BY MS. STERLING:

6 Q Please point me to the
7 experiments in McLean that relate to
8 testing an antibody having a human
9 hybrid IgG2-IgG4 constant region?

10 A None of the experiments in
11 McLean relate to experiments involving
12 a human hybrid IgG2-IgG4 antibody.

13 Q You can set that document to
14 the side.

15 I am going to hand you a
16 document that's been previously marked
17 Exhibit 2014.

18 A (Reviewing.

19 Q This document is entitled,
20 Complementarity, specificity and the
21 nature of epitopes and paratopes in
22 multivalent interactions.

23 First author is Neil
24 Greenspan.

25 Do you see that?

1 ARTURO CASADEVALL, MD, PhD

2 A I see that.

3 Q I am going to call

4 Exhibit 2014, Greenspan for our
5 discussion, okay?

6 Do you recognize this
7 Greenspan paper?

8 A I recognize the Greenspan
9 paper.

10 Q Okay.

11 You discuss it in paragraph
12 110 of your declaration, correct?

13 A (Reviewing.) 110, yes.

14 "For example, in 1995,
15 Greenspan and Cooper published an
16 article describing how IgG3 monoclonal
17 antibodies had been observed to more
18 effectively bind target antigens than
19 IgG1, IgG2B monoclonal antibodies or,
20 IgG3-derived Fab fragments with the
21 same variable sequences. Alexion --
22 or ALXN2014 at 227.

23 Q Does Greenspan provide any
24 experiments relating to testing an
25 antibody with a human hybrid IgG2-IgG4

1 ARTURO CASADEVALL, MD, PhD

2 constant region?

3 MR. DIAMOND: Objection to
4 form.

5 THE WITNESS: Greenspan --
6 Greenspan describes how the
7 changing of the constant region
8 affects defined specificity. In
9 this paper, there are no
10 experiments on a hybrid human
11 IgG2-IgG4 antibody.

12 BY MS. STERLING:

13 Q I am going to hand you
14 what's been previously -- you can put
15 that to the side.

16 I am going to hand you
17 what's been previously identified
18 Exhibit 2011.

19 A (Reviewing.)

20 Q This is a journal article
21 entitled, Can immunoglobulin CH1
22 constant region domain modulate
23 antigen binding affinity of
24 antibodies.

25 And has a first author of

1 ARTURO CASADEVALL, MD, PhD

2 Otto Pritsch.

3 Do you see that?

4 A I see the article.

5 Q Okay.

6 I am going to call this

7 Exhibit 2011 Pritsch in our

8 discussion, okay?

9 A Yes.

10 Q Do you recognize this paper?

11 A Yes.

12 Q And you discussed Pritsch in

13 paragraph 111 of your declaration,

14 correct?

15 A Yes. It states, in 1996,

16 Pritsch, et al., published a study

17 comparing the binding activity of two

18 antibodies with identical variable

19 region sequences in either IgG or IgA

20 isotype -- the authors found in spite

21 of sharing identical variable domain

22 sequences having identical light chain

23 constant domains and recognize

24 overlapping epitopes on the antigen,

25 both antibodies significantly differed

1 ARTURO CASADEVALL, MD, PhD
2 in their affinity for the target
3 antigen.

4 Q Does Pritsch provide any
5 experiments relating to testing an
6 antibody that has a human hybrid
7 IgG2-IgG4 constant region?

8 MR. DIAMOND: Objection to
9 form.

10 THE WITNESS: Pritsch is one
11 of the articles that sites how the
12 constant region can affect defined
13 specificity and that is the
14 background.

15 BY MS. STERLING:

16 Q Can you point me to
17 experiments or any report in Pritsch
18 of an antibody having a human hybrid
19 IgG2-IgG4 constant region?

20 A Pritsch does not have
21 experiments containing IgG1 or IgG2
22 hybrid constant regions.

23 Q My question related to
24 IgG2-IgG4 constant domains.

25 Does Pritsch report --

1 ARTURO CASADEVALL, MD, PhD

2 A Sorry, I made a -- I
3 misspoke.

4 Pritsch does not contain any
5 experiment related to hybrid antibody
6 containing the CH2 or CH4 hybrids
7 domains.

8 Q You can set that to the
9 side.

10 I am going to hand you what
11 has been previously marked as
12 Exhibit 2008.

13 A (Reviewing.)

14 Q This is a journal article
15 entitled, Human constant regions
16 influence the antibody binding
17 characteristics of mouse-human
18 chimeric IgG sub classes, with first
19 author N. McCloskey.

20 Do you see that?

21 A I see that.

22 Q You discuss this paper in
23 paragraph 112 of your declaration,
24 correct?

25 A Yes.

1 ARTURO CASADEVALL, MD, PhD

2 Q Okay.

3 So you are familiar with
4 this paper?

5 A I am familiar with this
6 paper.

7 Q Okay.

8 Does McCloskey provide any
9 experiments relating to testing an
10 antibody with a human hybrid IgG2-IgG4
11 constant region?

12 MR. DIAMOND: Objection to
13 form.

14 THE WITNESS: McCloskey
15 thought that despite having the
16 same variable region sequences,
17 human antibodies of different IgG
18 subclasses which bind the same
19 antigen have been shown to differ
20 in functional affinity.

21 BY MS. STERLING:

22 Q Can you point me to any data
23 in McCloskey that relates to a
24 human -- sorry -- that relates to an
25 antibody having a human hybrid

1 ARTURO CASADEVALL, MD, PhD

2 IgG2-IgG4 constant region?

3 MR. DIAMOND: Objection to
4 form.

5 THE WITNESS: (Reviewing.)

6 In McCloskey there are no
7 experiments involving an IgG2-IgG4
8 hybrid monoclonal antibody.

9 BY MS. STERLING:

10 Q You can set that to the
11 side.

12 I am going to hand you a
13 document that's been previously marked
14 as Exhibit 2009.

15 A (Reviewing.)

16 Q This is a journal article
17 entitled, The immunoglobulin heavy
18 chain constant region affects kinetic
19 and thermodynamic parameters of
20 antibody variable region interaction
21 with antigen, and lists Marcela Torres
22 as the first author.

23 Do you see that?

24 A I see that.

25 Q This is another publication

1 ARTURO CASADEVALL, MD, PhD

2 from your lab, correct?

3 A That is correct.

4 Q So you are familiar with
5 this publication?

6 A I am familiar with this
7 publication.

8 Q Okay.

9 You discuss this publication
10 in paragraph 113 of your declaration,
11 correct?

12 A Yes.

13 Q Does this Exhibit 2009
14 provide any experiments relating to
15 testing an antibody that has a human
16 hybrid IgG2-IgG4 constant region?

17 MR. DIAMOND: Objection to
18 form.

19 THE WITNESS: In this paper,
20 as well as the papers that we have
21 discussed previously, the message
22 is that the constant region could
23 affect antibody binding and
24 specificity.

25 There are no experiments in

1 ARTURO CASADEVALL, MD, PhD
2 this paper dealing with IgG2-IgG4
3 hybrids. But the message is that
4 if you change the constant region
5 and you do something to the
6 constant region, you could be
7 affecting binding.

8 BY MS. STERLING:

9 Q But there's no data in
10 Exhibit 2009 that relates to
11 monoclonal antibodies having a human
12 hybrid IgG2-IgG4 constant region
13 correct?

14 MR. DIAMOND: Objection to
15 form. Asked and answered.

16 THE WITNESS: The concept
17 that is included in this paper
18 will include a gamma 2-gamma 4
19 antibody, even though there is no
20 direct data on gamma 2-gamma 4.
21 Because the principle is that if
22 you change the constant region and
23 you alter it in some way, the
24 outcome is unpredictable.

25 BY MS. STERLING:

1 ARTURO CASADEVALL, MD, PhD

2 Q There's no mention in this
3 paper of experiments looking at an
4 antibody with an IgG2-IgG4 hybrid
5 constant region, correct?

6 A There is no experiment
7 dealing with hybrid IgG2-IgG4, but the
8 concept, the constant region can
9 affect the variable region, supersedes
10 any combination that you want to do.
11 So the message is included.

12 Q Okay. You can set that
13 aside.

14 I am going to hand you
15 what's been previously marked as
16 Exhibit 2040.

17 A (Reviewing.)

18 Q This is a reference
19 entitled, Variable-region-identical
20 antibodies differing in isotype
21 demonstrate differences in fine
22 specificity and idiotypic. Again,
23 first author is Marcela Torres.

24 Do you see that?

25 A I see the paper,

1 ARTURO CASADEVALL, MD, PhD
2 Variable-region-identical antibodies
3 differing in isotype demonstrate
4 differences in fine specificity and
5 idiotype, by Marcela Torres.

6 Q This is another publication
7 that you are listed on, correct?

8 A This is another publication
9 from my laboratory.

10 Q So you are familiar with
11 this Exhibit 2040, correct?

12 A I am familiar with
13 exhibit -- with this paper.

14 Q You cite it in paragraph 113
15 of your declaration, correct?

16 A 113?

17 Q Yes?

18 A Reviewing.) Yes, I cite it
19 in paragraph 113.

20 Q Does Exhibit 2040 provide
21 any experiments relating to testing an
22 antibody with a human hybrid IgG2-IgG4
23 constant region?

24 MR. DIAMOND: Objection to
25 form.

1 ARTURO CASADEVALL, MD, PhD

2 THE WITNESS: The paper
3 reports that when you change the
4 constant region, you alter fine
5 specificity and idiotypic. And
6 this is a general principle that
7 would apply to all changes.
8 Although IgG2 and IgG4 are not
9 included specifically in this
10 paper, the constant would apply to
11 them.

12 BY MS. STERLING:

13 Q What are the constant
14 regions compared in this paper?

15 A IgG1, IgG2A, IgG2B and IgG3.

16 Q You have to agree with me
17 none of those are human hybrid
18 IgG2-IgG4, correct?

19 MR. DIAMOND: Objection to
20 form.

21 THE WITNESS: The antibodies
22 that were studied in the paper
23 were not hybrids of IgG2-IgG4, but
24 they were -- they show that when
25 you change the constant region,

1 ARTURO CASADEVALL, MD, PhD
2 you change a key qualities of the
3 antibody as measured by fine
4 specificity and idiotypic, and
5 establish a concept that is
6 broader and will encompass any
7 IgG2-IgG4 construction.

8 BY MS. STERLING:

9 Q You can set that aside.
10 I am going to hand you
11 another exhibit, previously marked
12 Exhibit 2039.

13 A (Reviewing.)

14 Q This is a reference
15 entitled, Exchanging murine and human
16 immunoglobulin constant chains affects
17 the kinetics and thermodynamics of
18 antigen binding and chimeric antibody
19 autoreactivity. Again, first author
20 Marcela Torres.

21 Do you see that?

22 A I see you that you have
23 handed me the paper, Exchanging murine
24 and human immunoglobulin constant
25 chains affects the kinetics and

1 ARTURO CASADEVALL, MD, PhD
2 thermodynamics of antigen binding and
3 chimeric antibody autoreactivity, by
4 Marcela Torres.

5 Q Again, this is a publication
6 from your lab, correct?

7 A This is a publication from
8 my laboratory.

9 Q So you are familiar with
10 this paper?

11 A I am familiar with this
12 paper.

13 Q You discuss Exhibit 2039 in
14 paragraph 113 of your declaration,
15 correct?

16 A (Reviewing.) I'm sorry,
17 what paragraph?

18 Q 113.

19 A 113.

20 Q Yeah.

21 A (Reviewing.) This paper is
22 discussed in paragraph 113 of the
23 declaration.

24 Q When was this paper that's
25 Exhibit 2039 published?

1 ARTURO CASADEVALL, MD, PhD

2 A December 2007.

3 Q So it wasn't published until
4 after March 15, 2007, correct?

5 A It was not published until
6 after March 15, 2007.

7 Q So a person ordinary skill
8 in the art would not have been able to
9 read this paper prior to March 2007,
10 correct?

11 A A person -- the paper would
12 not have been published; therefore, a
13 POSA would not have seen the paper.

14 Q You can set that aside.

15 I am going to hand you
16 reference previously marked
17 Exhibit 2012.

18 A (Reviewing.)

19 Q It's a paper entitled, Can
20 isotype switch modulate
21 antigen-binding affinity and influence
22 clonal selection. First author, Otto
23 Pritsch.

24 Do you see that?

25 A Can isotype switch modulate

1 ARTURO CASADEVALL, MD, PhD
2 antigen-binding affinity and influence
3 clonal selection, by Otto Pritsch.

4 Q Do you recognize this paper?

5 A Yes.

6 Q And you discuss this paper
7 in paragraph 114 of your declaration,
8 correct?

9 A Yes.

10 Q Does this Pritsch paper,
11 Exhibit 2012, provide any experiments
12 relating to testing an antibody having
13 a human hybrid IgG2-IgG4 constant
14 region?

15 MR. DIAMOND: Objection to
16 form.

17 THE WITNESS: This paper
18 reports that when you change the
19 isotype, it will modulate the
20 antigen-binding activity and fits
21 within the concept that if you
22 change the constant region, you
23 have unpredictable effects.

24 As to whether IgG2/4 hybrid
25 was included in this paper, the

1 ARTURO CASADEVALL, MD, PhD
2 answer is -- (Reviewing.) -- the
3 answer is no. But the concept
4 would apply to IgG2-IgG4 hybrid
5 since the principle is the same.

6 BY MS. STERLING:

7 Q But just to be clear,
8 there's no experiments relating to
9 testing an antibody with a human
10 hybrid IgG2-IgG4 constant region
11 reported in Pritsch Exhibit 2012?

12 MR. DIAMOND: Objection to
13 form. Asked and answered.

14 THE WITNESS: The paper
15 reports set of antibodies which
16 include IgM, IgA, IgG1, IgG2 and
17 IgG4. It does not include a
18 hybrid of IgG2-IgG4.

19 BY MS. STERLING:

20 Q You can set that one to the
21 side, please.

22 I am going to hand you an
23 exhibit that's been previously marked
24 2010.

25 A (Reviewing.)

1 ARTURO CASADEVALL, MD, PhD

2 Q It's a reference entitled,
3 IG constant region effects on variable
4 region structure and function, and
5 lists first author Alena Janda.

6 Do you see that?

7 A Yes.

8 Q You're also listed as an
9 author here, correct?

10 A The paper is, IG constant
11 region effects on variable region
12 structure and function, by Alena
13 Janda, and it is a paper from my
14 laboratory.

15 Q When was this paper
16 published?

17 A February '16 -- 20 -- I'm
18 sorry, February 2016.

19 Q So this paper was not
20 published until after March 15, 2007,
21 correct?

22 MR. DIAMOND: Objection to
23 form.

24 THE WITNESS: This paper was
25 published February 2016, which is

1 ARTURO CASADEVALL, MD, PhD

2 after March 15, 2007.

3 BY MS. STERLING:

4 Q Okay. You can set that one
5 aside. Thank you.

6 I am going to hand you a new
7 document that's been previously marked
8 as Exhibit 1007.

9 A (Reviewing.)

10 Q This is a US Patent. It's
11 Patent Number 6,355,245, listing first
12 inventor Mark Evans.

13 Do you see that?

14 A (Reviewing.) I see US
15 Patent 6,355,245 listing Mark Evans as
16 the first named inventor.

17 Q Are you familiar with this
18 document?

19 A (Reviewing.) I am familiar
20 with this document.

21 Q I am going to refer to this
22 Exhibit 1007 as Evans during our
23 discussion of it. Is that okay?

24 A It's okay with me.

25 Q Okay.

1 ARTURO CASADEVALL, MD, PhD

2 So let's look at example 11
3 of Evans. It starts at column 42.
4 The columns are at the top of the
5 document.

6 Let me know when you're
7 there.

8 A (Reviewing.) Example 11?

9 Q Yes.

10 A Page 43?

11 Q Column 42, page 43.

12 A I am here.

13 Q I am going to refer to
14 column and line numbers. So just for
15 clarity, the column numbers are at the
16 top of the document and down the
17 center of the document there are line
18 number increments of five.

19 I am going to use that to
20 point you to various places in this
21 document.

22 Is that okay?

23 A Yes.

24 Q If you need clarity, let me
25 know.

1 ARTURO CASADEVALL, MD, PhD

2 A I will let you know.

3 Q Okay.

4 So this example 11 is
5 entitled, Construction and expression
6 of recombinant mAbs; is that correct?

7 A Construction and expression
8 of recombinant mAbs.

9 Q And mAbs is shorthand for
10 monoclonal antibodies, correct?

11 A Sure.

12 MR. DIAMOND: Objection to
13 form.

14 THE WITNESS: The term
15 "mAbs" generally refers to
16 monoclonal antibodies.

17 BY MS. STERLING:

18 Q Okay.

19 So here in this example,
20 just read that first paragraph. This
21 example --

22 MR. DIAMOND: Sorry, go on.

23 I want to see if there is a
24 question pending.

25 BY MS. STERLING:

1 ARTURO CASADEVALL, MD, PhD

2 Q In this example, in this
3 first paragraph, says, "Recombinant
4 DNA constructions encoding there are
5 recombinant mAbs comprising 5G1.1 CDRs
6 are prepared by conventional
7 recombinant DNA methods, including
8 restriction fragment subcloning and
9 overlapping PCR procedures."

10 Do you see that?

11 A "Recombinant DNA
12 constructions encoding there are
13 recombinant mAbs comprising 5G1.1 CDRs
14 are prepared by conventional
15 recombinant DNA methods, including
16 restriction fragment subcloning and
17 overlapping PCR procedures."

18 Q Okay.

19 And then the next sentence
20 tells you that the resulting
21 recombinant mAb encoding DNAs include,
22 and it has a list of 18 constructs
23 that continue over the next few
24 columns to the start of column 45.

25 Would you agree?

1 ARTURO CASADEVALL, MD, PhD

2 MR. DIAMOND: Objection to
3 form.

4 THE WITNESS: The next
5 paragraph says, One encoding a
6 non-humanized murine scFv
7 designated 5G1.1M1, scFv (SEQ ID
8 NO:7) --

9 BY MS. STERLING:

10 Q I don't mean to interrupt
11 you. I think you're looking at
12 different place from where I pointed
13 you to.

14 I pointed you to the next
15 sentence after the one we just read.
16 And that sentence says, "The resulting
17 recombinant monoclonal antibody
18 encoding DNAs include..." and then it
19 lists 18 constructs.

20 MR. DIAMOND: Objection --

21 BY MS. STERLING:

22 Q I want you to confirm that
23 for me.

24 MR. DIAMOND: Objection to
25 form.

1 ARTURO CASADEVALL, MD, PhD

2 THE WITNESS: (Reviewing.)

3 It states that the resulting
4 recombinant monoclonal antibody,
5 including DNA or mAb including DNA
6 include...

7 BY MS. STERLING:

8 Q And then after that it lists
9 18 constructs over the next few
10 columns, if you can look at that and
11 confirm.

12 MR. DIAMOND: Objection to
13 form.

14 THE WITNESS: (Reviewing.)
15 The patent is ambiguous because
16 these are fragments and the
17 introductory sentence talks about
18 monoclonal antibody.

19 BY MS. STERLING:

20 Q Okay.
21 So these constructs are
22 fragments; is that a fair description
23 of the constructs?

24 MR. DIAMOND: Objection to
25 form.

1 ARTURO CASADEVALL, MD, PhD

2 THE WITNESS: I would have
3 to go through them, but they
4 are -- they are designated S,
5 single chain, Fv. That would be
6 one single chain.

7 Single chain Fd, chimeric
8 light chain. Chimeric Fd.
9 Humanized Fd, as in David;

10 (6), including a humanized
11 Fd, as in David;

12 Humanized (CDR grafted and
13 framework sequence altered) light
14 chain designated 5G1.1 VL+KVL 56;

15 One encoding a humanized
16 (CDR grafted, not framework
17 alerted) light chain designated
18 5G1.1;

19 One encoding humanized (CDR
20 grafted not framework altered)
21 light chain designated 5G1;

22 One encoding humanized (CDR
23 grafted, not framework altered) Fd
24 designated 5G1.1 VH+IGHRLD (SEQ ID
25 NO:16);

1 ARTURO CASADEVALL, MD, PhD

2 One encoding humanized (CDR

3 grafted) scFv designated 5G1.1

4 scFv D012, (SEQ ID NO:17);

5 (12) when encoding a

6 humanized (CDR grafted and

7 framework sequence altered) scFv

8 designated 5G1.1 scFv;

9 One encoding a humanized

10 (CDR grafted) scFv designated

11 5G1.1 scFv D012B, (SEQ ID NO:21);

12 One encoding a humanized

13 (CDR grafted) scFv designated

14 5G1.1 scFv D012C, (SEQ ID NO:22);

15 One encoding a humanized

16 (CDR grafted) scFv designated

17 5G1.1 scFv --

18 I will repeat.

19 One encoded a humanized (CDR

20 grafted) scFv designated 5G1.1

21 scFv, D012D (SEQ ID NO:23);

22 One encoding a humanized

23 (CDR grafted and framework

24 sequence altered) scFv designated

25 5G1.1 scFv C013 (SEQ ID NO:24);

1 ARTURO CASADEVALL, MD, PhD

2 One encoding a humanized
3 (CDR grafted and framework
4 sequence altered) sc designated
5 5G1.1 scFv C014 (SEQ ID NO:25);

6 And, one encoding a
7 humanized (CDR grafted and
8 framework sequence altered) scFv
9 designated 5G1.1 scFv C015 (SEQ ID
10 NO:26).

11 So the first 26 items -- I'm
12 sorry, the first 18 items are all
13 fragments.

14 BY MS. STERLING:

15 Q Okay.

16 Some of those fragments are
17 humanized 5G1.1 scFv fragments,
18 correct?

19 MR. DIAMOND: Objection to
20 form.

21 THE WITNESS: Some of those
22 are fragments are described -- are
23 encoding a humanized CDR grafted
24 scFv designated 5G1.1 scFv D012D.

25 BY MS. STERLING:

1 ARTURO CASADEVALL, MD, PhD

2 Q Okay.

3 So I am going to take you

4 through some of these constructs.

5 Let's start with construct 2. Okay?

6 MR. DIAMOND: Objection to

7 the characterization.

8 BY MS. STERLING:

9 Q Is there a term you prefer

10 me to use when I point you to these

11 numbered --

12 A I think 2 is fine.

13 Q Can I call it construct 2;

14 is that fair?

15 MR. DIAMOND: Objection to

16 form.

17 THE WITNESS: It's not a

18 construct 2. It's -- 2 is the

19 list -- listed. I think if you

20 are going to call it something, I

21 would call it by the proper name.

22 BY MS. STERLING:

23 Q Okay.

24 So I am going to point you

25 to number 2 which is, a humanized (CDR

1 ARTURO CASADEVALL, MD, PhD
2 grafted) scFv designated 5G1.1 scFv CB
3 (SEQ ID NO:8).

4 Do you see that?

5 A Sequence number?

6 Q 8.

7 A 8. I see one encoding a
8 humanized (CDR grafted) scFv
9 designated 5G1.1 scFv CB (SEQ ID
10 NO:8).

11 Q Then in this number 2 that
12 we are looking at provides: CDR L1,
13 CDR L2, CDR L3. And I point you
14 toward where the amino acid residues
15 are for those CDR regions.

16 Do you see that?

17 MR. DIAMOND: Objection to
18 form.

19 THE WITNESS: It states CDR
20 L1 is amino acid residues 26 to 36
21 of SEQ ID NO:8; CDR L2 is amino
22 acid residues 52 to 58 of SEQ ID
23 NO:8; CDR L3 is amino acid
24 residues 91 to 99 of SEQ ID NO:8;
25 CDR H1 is amino acid residues 152

1 ARTURO CASADEVALL, MD, PhD
2 to 161 of SEQ ID NO:8; CDR H2 is
3 amino acid residues 176 to 192 of
4 SEQ ID NO:8; H3 is amino acid
5 residues 225 to 237 of SEQ ID
6 NO:8.

7 BY MS. STERLING:

8 Q CDR L1, CDR L2 and CDR L3,
9 that's mentioned in this number 2,
10 would a person of ordinary skill in
11 the art understand those to be
12 complementarity determining regions in
13 the light gene of this scFv?

14 A When you see L, it usually
15 refers to light. Yes.

16 Q And when we -- when a person
17 of ordinary skill would see CDR H1 and
18 CDR H2, and last entry just says H3,
19 would a person of ordinary skill in
20 the art understand those to be the
21 CDR -- CDRs in the heavy chain, 1, 2,
22 and 3?

23 MR. DIAMOND: Objection to
24 the form.

25 THE WITNESS: A person of

1 ARTURO CASADEVALL, MD, PhD
2 skill in the art would have known
3 that there is uncertainty on how
4 to define CDRs.

5 So it would have taken those
6 numbers but it would not have been
7 sure as to what CDRs they really
8 referring to.

9 BY MS. STERLING:

10 Q What other CDRs would they
11 be referring to aside from CDR1, 2,
12 and 3 in the heavy chain here?

13 A A POSA at that time would
14 have known there are two -- at least
15 two general ways to describe a CDR;
16 one is known as Kabat method and the
17 other is known as Chothia method. And
18 those methods differ on the ends of
19 the CDR or what is included. And a
20 POSA reading this paragraph would not
21 know where -- what CDRs is being
22 referred to.

23 Q A POSA reading CDR H2 would
24 not understand that it's referring to
25 CDR2 in the heavy chain of this scFv

1 ARTURO CASADEVALL, MD, PhD

2 in number 2?

3 MR. DIAMOND: Objection to
4 form.

5 THE WITNESS: I think person
6 reading CDR2 would have looked at
7 this and say, well, those are the
8 CDRs that they define. But a
9 person knowledgeable in the field
10 would have looked at this data
11 much more carefully than just
12 taking those numbers from there.

13 BY MS. STERLING:

14 Q So even though Evans tells
15 you that the specific amino acid
16 residues in the CDR regions, you don't
17 think that's informative enough --

18 MR. DIAMOND: Objection.

19 BY MS. STERLING:

20 Q -- to a POSA?

21 MR. DIAMOND: Sorry.

22 Objection to form.

23 Mischaracterizes.

24 THE WITNESS: Evans doesn't
25 tell me what kind of method they

1 ARTURO CASADEVALL, MD, PhD
2 use to establish the ends of the
3 CDRs.

4 BY MS. STERLING:

5 Q But Evans just gives you the
6 amino acid residues that Evans
7 considers to be CDR regions in either
8 the light chain or heavy chain,
9 correct?

10 MR. DIAMOND: Objection to
11 form.

12 THE WITNESS: A POSA -- a
13 POSA would have looked at this and
14 know there's ambiguity on where
15 the CDRs begin and end for both
16 the heavy and the light chain.

17 BY MS. STERLING:

18 Q So that's twice you have
19 said this patent is ambiguous,
20 correct?

21 A I didn't say the patent is
22 ambiguous.

23 MR. DIAMOND: Objection to
24 form.

25 BY MS. STERLING:

1 ARTURO CASADEVALL, MD, PhD

2 Q I'm sorry.

3 You said example 11 -- twice
4 you said example 11 has been
5 ambiguous; is that correct?

6 MR. DIAMOND: Objection to
7 the form. The witness' testimony
8 stands as it is.

9 THE WITNESS: I said that
10 the CDR as listed, the POSA would
11 be cautious on assigning those
12 numbers to the CDRs.

13 BY MS. STERLING:

14 Q Even though Evans tells you
15 expressly the amino acid residues that
16 Evans associates with the CDR regions?

17 MR. DIAMOND: Objection to
18 form.

19 THE WITNESS: Evans is
20 defining some CDRs here. A POSA
21 would have looked at the data and
22 would have looked at it with
23 caution because a POSA would have
24 known that CDRs -- the borders
25 are defined differently depending

1 ARTURO CASADEVALL, MD, PhD

2 on the method.

3 BY MS. STERLING:

4 Q But Evans has defined its
5 borders, right?

6 Because Evans gives you the
7 amino acid residues, for example, CDR
8 H3 of 225 to 237 SEQ ID NO:8.

9 Do you see that?

10 MR. DIAMOND: Objection to
11 form.

12 THE WITNESS: I see that.
13 But I also say to you that a POSA
14 or somebody -- a POSA -- we have
15 defined a POSA would have read
16 that and come across some -- with
17 degree of ambiguity as to what CDR
18 method they are using to label --
19 to make those assignments.

20 BY MS. STERLING:

21 Q But the assignments are
22 finally labeled, regardless of the
23 method used to get there; Evans has
24 described amino acid residues to the
25 CDR regions provided here in number 2,

1 ARTURO CASADEVALL, MD, PhD

2 correct?

3 A Evans has stated -- has said
4 of light chain and heavy chain CDRs.
5 They are listed here with numbers.

6 A POSA would have read this,
7 would have seen the numbers, and would
8 have known that there is ambiguity on
9 how you define a CDR based on the
10 Chothia and Kabat methods.

11 Q Okay.

12 But let's look at why Evans
13 chose to define Evans' regions. Okay?
14 We will focus on that.

15 Evans provides CDR H3 of
16 amino acid residues 225 to 237 of SEQ
17 ID NO:8.

18 Do you see that?

19 MR. DIAMOND: Objection to
20 form. Mischaracterizes.

21 THE WITNESS: I'm sorry, are
22 we still on number 2?

23 BY MS. STERLING:

24 Q Yes.

25 A Where are you at now?

1 ARTURO CASADEVALL, MD, PhD

2 Q The very last entry, H3 is
3 amino acid residues 225 to 237 of SEQ
4 ID NO:8.

5 A A POSA would have read that
6 and known that Evans define it as 225
7 to 237. But a knowledgeable -- a
8 knowledgeable individual would have
9 looked at that and said, you know,
10 those are the boundaries that Evans
11 gives me, but CDRs are defined with
12 some variability depending on the
13 method. So...

14 Q Okay.

15 I am going to point you to
16 column 5 in Evans. And I am going to
17 direct you to line 25. So again, look
18 for the numbers between the two
19 columns, look for 25.

20 There's a paragraph that
21 starts, "There are two definitions of
22 CDR location are currently in general
23 use in the art."

24 Do you see the paragraph
25 that starts with that sentence?

1 ARTURO CASADEVALL, MD, PhD

2 A (Reviewing.) I see the
3 paragraph that starts with that
4 sentence.

5 Q Okay.

6 About halfway down that
7 paragraph there's a sentence that
8 starts, "As used herein, the terms..."
9 And then it lists some terms.

10 Do you see that sentence?

11 A "As used herein, the terms
12 VL CDR1, VL CDR2, VL CDR3, VH CDR1, VH
13 CDR2 and VH CDR3 refer minimally to
14 the region of overlap between the
15 regions designated for each CDR by
16 each of these two definitions, and
17 maximally, to the total region spanned
18 by the combination of regions
19 designated for each CDR by each of
20 these two definitions."

21 Q Okay.

22 So Evans has explained what
23 Evans means by these terms in the '245
24 patent.

25 Do you agree?

1 ARTURO CASADEVALL, MD, PhD

2 A I disagree. I think this
3 is -- there is -- the POSA would have
4 been confused by the term "refer
5 minimally to the region of overlap
6 between the regions designated for
7 each CDR by each of these two
8 definitions."

9 Q So you're telling me Evans
10 is ambiguous as to how it's using
11 these terms?

12 MR. DIAMOND: Objection to
13 form.

14 THE WITNESS: I am saying
15 that as I would read this, the
16 words that the POSA would not have
17 come across with a clear way in
18 which this CDRs were defined
19 because it's referring minimally
20 to the region of overlap between
21 this region's designated for each
22 CDR by each of the two
23 definitions, and maximally to the
24 total region spanned by the
25 combination of regions designated

1 ARTURO CASADEVALL, MD, PhD
2 by each CDR by each of these two
3 definitions.

4 That is a mouthful and
5 difficult to understand exactly
6 what the definition is here.

7 BY MS. STERLING:

8 Q So a person of ordinary
9 skill in the art reading Evans would
10 not have understood what Evans is
11 referring to when it talks about CDR
12 H1 or CDR -- VH CDR3, a person of
13 ordinary skill in the art would not
14 have understood Evans' definition nor
15 any of the reported constructs in
16 Evans.

17 Is that what you are telling
18 me?

19 MR. DIAMOND: Objection to
20 the form. Asked and answered.

21 THE WITNESS: I disagree
22 with the premise of your question.

23 A POSA at the time would
24 have read this as Evans'
25 definitions of CDRs, but would

1 ARTURO CASADEVALL, MD, PhD
2 have had some uncertainty as to
3 whether these are the actual CDRs
4 in these -- in this fragments.

5 BY MS. STERLING:

6 Q So you're telling me a
7 person of ordinary skill in the art
8 would have had uncertainty as to what
9 Alexion's patent was teaching the
10 public?

11 MR. DIAMOND: Objection to
12 form.

13 THE WITNESS: I did not say
14 that. I said that person -- a
15 POSA at the time would have
16 uncertainty as to where the
17 boundaries are for this CDRs based
18 on two definitions, based on the
19 wording of the sentence.

20 BY MS. STERLING:

21 Q So even though Evans itself
22 puts amino acid residue boundaries on
23 these CDRs in these numerical scFv
24 constructs we are discussing, you are
25 telling me there's still uncertainty

1 ARTURO CASADEVALL, MD, PhD

2 as to what that means?

3 MR. DIAMOND: Objection to
4 form.

5 THE WITNESS: A POSA would
6 have read that and concluded that
7 that's how Evans is defining the
8 CDRs. But a POSA would have known
9 that there is uncertainty in the
10 science on how you define a CDR,
11 and would have been cautious with
12 those numbers.

13 BY MS. STERLING:

14 Q But Evans, in his own
15 patent -- do you understand a patentee
16 can be its on a lexicographer?

17 MR. DIAMOND: Objection to
18 form. Calls for legal conclusion.

19 MS. STERLING: I'm asking if
20 he has an understanding. He can
21 answer yes or no whether he does.

22 BY MS. STERLING:

23 Q Do you have an understanding
24 on that legal concept?

25 MR. DIAMOND: Objection.

1 ARTURO CASADEVALL, MD, PhD

2 THE WITNESS: On what legal
3 concept?

4 BY MS. STERLING:

5 Q That a patentee act as his
6 or her own lexicographer?

7 A I have no idea --

8 Q Okay.

9 A -- about this concept.

10 Q Okay.

11 So even though I am -- I am
12 going to go back -- Evans has told you
13 how Evans is using these terms in his
14 paper, you are saying that's still
15 confusing and ambiguous; is that fair?

16 MR. DIAMOND: Where are we
17 looking now? Are we in column 5?

18 MS. STERLING: Column 5.
19 Keep up.

20 MR. DIAMOND: Objection to
21 form. Asked and answered.

22 THE WITNESS: What I have
23 said, and I will repeat it again,
24 is that Evans provides a set of
25 amino acids that Evans is calling

1 ARTURO CASADEVALL, MD, PhD
2 the CDRs.

3 A POSA at the time would
4 have seen those numbers and known
5 that there is ambiguity in the
6 beginnings and the ends of CDRs,
7 as evident by the fact that the
8 field was working with two
9 definitions.

10 BY MS. STERLING:

11 Q Okay.

12 Let's focus on -- you said
13 Evans provides a set of amino acids
14 that Evans is calling the CDRs. Let's
15 focus on those sets of amino acids,
16 please.

17 MR. DIAMOND: Objection.
18 Mischaracterizes the witness'
19 testimony.

20 MS. STERLING: I read it
21 exactly back from the record.
22 Thank you, Evan.

23 MR. DIAMOND: You read a
24 partial statement.

25 BY MS. STERLING:

1 ARTURO CASADEVALL, MD, PhD

2 Q Number 2, Evans says, CDR H3
3 is amino acid residue to 25 to 237 of
4 SEQ ID NO:8.

5 MR. DIAMOND: Objection.

6 BY MS. STERLING:

7 Q This is what Evans is
8 calling it's CDR H3, correct?

9 MR. DIAMOND: Objection to
10 form.

11 BY MS. STERLING:

12 Q We are back in column 43.

13 MR. DIAMOND: Why don't you
14 ask the question again once he's
15 back on 43.

16 THE WITNESS: I am back in
17 43.

18 MR. DIAMOND: Can you ask
19 the question again.

20 BY MS. STERLING:

21 Q Evans says in this number 2,
22 that Evans CDR H3 gives us an amino
23 acid residue group. Okay?

24 So Evans says H3 is amino
25 acid residues 225 to 237 of SEQ ID

1 ARTURO CASADEVALL, MD, PhD

2 NO:8.

3 Do you see that?

4 MR. DIAMOND: Objection to
5 form.

6 THE WITNESS: I see the
7 patent says that H3 is amino acid
8 residues 225 to 237 of SEQ ID
9 NO:8.

10 BY MS. STERLING:

11 Q Okay.

12 Amino residues 225 to 2347,
13 is that a 13 amino acid residue --is
14 that 13 amino acids in residues 225 to
15 237?

16 MR. DIAMOND: Objection to
17 form.

18 THE WITNESS: 225, 26, 27,
19 28, 29, 30, 31, 32, 33, 34, 35,
20 36, 37, those numbers will
21 correspond to 13 amino acids. But
22 this is -- what has been listed
23 here, a POSA at the time would
24 have looked at those numbers with
25 great deal of caution because the

1 ARTURO CASADEVALL, MD, PhD
2 boundaries of CDRs are uncertain
3 depending on how you define them.

4 BY MS. STERLING:

5 Q Okay.

6 Let's look at number 11. It
7 starts at the bottom of column 43 and
8 extends over to column 44.

9 The end of number 11, it is
10 the second and third line on column
11 44, Evans -- sorry. Let me start with
12 what number 11 is.

13 Evans says it's one encoding
14 a humanized (CDR grafted) scFv
15 designated 5G1.1 scFv D012 (SEQ ID
16 NO:17). And Evans lists at the end of
17 the paragraph CDR H3 is amino acid
18 residues 225 to 237 of SEQ ID NO:17.

19 Do you see that?

20 MR. DIAMOND: Objection to
21 form. Compound.

22 THE WITNESS: Evans is
23 listing a different fragment.
24 Evans is using the same numbering
25 to refer to CDR H3. CDR H3 is

1 ARTURO CASADEVALL, MD, PhD
2 amino acid residues 225 to 237. A
3 POSA at the time would have read
4 this and would have been very
5 cautious in the interpretation of
6 where the CDRs are because it was
7 known by a POSA that there's
8 uncertainty in how you call the
9 ends.

10 BY MS. STERLING:

11 Q Evans himself says, CDR H3
12 is amino acid residues 225 to 237 of
13 SEQ ID NO:17.

14 Is 225 to 237, a 13 amino
15 acid stretch?

16 MR. DIAMOND: Hold on,
17 counsel. You just testified.
18 That's not a question. Okay. Ask
19 questions. What is your question?

20 BY MS. STERLING:

21 Q Is amino acids 225 to 237 of
22 SEQ ID NO:17, a 13 amino acid stretch?

23 MR. DIAMOND: Objection to
24 form.

25 THE WITNESS: As I counted

1 ARTURO CASADEVALL, MD, PhD
2 with my fingers, the numbers 225
3 to 237 would represent 13 amino
4 acids.

5 BY MS. STERLING:

6 Q Number 12 is another
7 fragment: One encoding a humanized
8 (CDR grafted and framework sequence
9 altered) scFv designated 5G1.1 scFv
10 CO12 (SEQ ID NO:20).

11 And at the end of that
12 entry, H3 is amino acid residues 225
13 to 237 of SEQ ID NO:20.

14 Do you see that?

15 MR. DIAMOND: Objection to
16 form.

17 THE WITNESS: At the end of
18 this paragraph I see the wording
19 H3 is amino acid residues 225 to
20 237 of SEQ ID 20. And --

21 (Whereupon a Discussion is
22 Held Off the Record.)

23 MS. STERLING: Finish,
24 please.

25 THE WITNESS: H3 is amino

1 ARTURO CASADEVALL, MD, PhD
2 acid residues 225 to 237 of SEQ ID
3 NO:20.

4 BY MS. STERLING:

5 Q Okay.

6 You would agree 225 to 237
7 is a 13 amino acid stretch of that
8 sequence ID number, correct?

9 MR. DIAMOND: Objection to
10 form.

11 THE WITNESS: I would say
12 that when you list 225 to 237 and
13 you count them in your fingers,
14 the number is 13.

15 BY MS. STERLING:

16 Q Okay.

17 So if you see an entry of
18 amino acid residues 225 to 237, you
19 would consider that to be a 13 amino
20 acid stretch?

21 MR. DIAMOND: Objection to
22 form.

23 THE WITNESS: But it would
24 not -- but I would not accept that
25 this is necessary -- a POSA would

1 ARTURO CASADEVALL, MD, PhD
2 not accept that this is
3 necessarily H3 domain. This is a
4 domain that's been labeled in the
5 patent. But the CDR domain
6 requires -- will require more
7 knowledge.

8 One of the problems with all
9 of this is that these are all
10 fragments. CDRs by Chothia and
11 Kabat were defined from
12 antibodies.

13 So there's uncertainty built
14 on uncertainty on these numbers.
15 A POSA would have known that, and
16 would have been very cautious in
17 taking any of these antibodies at
18 face value -- any of these numbers
19 at face value.

20 BY MS. STERLING:

21 Q So you're telling me each of
22 these fragments that we are discussing
23 1 through 18 here, you said you would
24 require more knowledge than what is
25 provided here to understand these

1 ARTURO CASADEVALL, MD, PhD

2 fragments; is that correct?

3 MR. DIAMOND: Objection to
4 the form.

5 THE WITNESS: I am saying
6 that from what is written here, I
7 accept that Evans has written H3
8 with the residues 225 to 237. But
9 a POSA would have been very
10 cautious looking at that number
11 and accepting that as the CDR H3.

12 BY MS. STERLING:

13 Q Okay.

14 That goes for any of the 18
15 we're looking at, correct?

16 MR. DIAMOND: Objection to
17 form.

18 THE WITNESS: We would have
19 to look at each one carefully.
20 But we already looked at them and
21 they are antibody fragments. None
22 of these is an antibody.

23 BY MS. STERLING:

24 Q For the fragments that we
25 are looking at your testimony applies

1 ARTURO CASADEVALL, MD, PhD

2 across them, correct?

3 MR. DIAMOND: Objection to
4 form.

5 THE WITNESS: No, I think if
6 you want we can discuss all 18 one
7 at a time.

8 BY MS. STERLING:

9 Q Let's look at 13, that is
10 the next one.

11 A Okay.

12 Q 13 is, one encoding a
13 humanized (CDR grafted) scFv
14 designated 5G1.1 scFv D012B (SEQ ID
15 NO:21).

16 And at the end again, we see
17 H3 is amino acid residues 225 to 237
18 of SEQ ID NO:21.

19 Do you see that?

20 A I see that at the very end,
21 H3 is amino acid residues 225 to 237
22 of sequence ID 21.

23 Evans is referring by H3 to
24 a CDR3, but the point is that a POSA
25 at this time would have looked at this

1 ARTURO CASADEVALL, MD, PhD
2 data and would have a great deal of
3 caution when accepting these numbers
4 as the boundaries for CDR -- for CDR3,
5 particularly when these are antibody
6 fragments.

7 Q But you would agree with me
8 that amino acid residues 225 to 237 of
9 SEQ ID NO:21 is a 13 amino acid
10 stretch?

11 A I would agree with you that
12 when you list 225 to 237, by counting,
13 it involves 13 amino acids.

14 Q Let's move on to number 14
15 then.

16 That is, one encoding a
17 humanized (CDR grafted) scFv
18 designated 5G1.1 scFv D012C, and
19 that's SEQ ID NO:22.

20 Again, at the end, H3 is
21 amino acid residues 225 to 237 of SEQ
22 ID NO:22.

23 Do you see that?

24 MR. DIAMOND: Objection to
25 form.

1 ARTURO CASADEVALL, MD, PhD

2 THE WITNESS: I see that at
3 the end H3 is amino acid residues
4 225 to 237 of SEQ ID NO:22.

5 A POSA reading this would
6 have read that as whatever was
7 listed and would have had great
8 caution in interpreting that
9 information as being the
10 boundaries of the CDR3.

11 BY MS. STERLING:

12 Q But you would agree with me
13 that amino acid residues 225 to 237 of
14 SEQ ID NO:22 is a 13 amino acid
15 stretch?

16 A It's a 13 amino acid --
17 yeah, 225 to 237 will involve 13 amino
18 acids.

19 Q Number 15 is, one encoding a
20 humanized (CDR grafted) scFv
21 designated 5G1.1 scFv D012D (SEQ ID
22 NO:23). And at the end of that entry
23 it says, H3 is amino acid residues 225
24 to 237 of SEQ ID NO:23.

25 Do you see that?

1 ARTURO CASADEVALL, MD, PhD

2 MR. DIAMOND: Objection to
3 form.

4 THE WITNESS: I see that the
5 ends of the sentence reads, H3 is
6 amino acid residues 225 to 237 of
7 SEQ ID NO:23.

8 BY MS. STERLING:

9 Q You would agree with me that
10 amino acid residues 225 to 237 of SEQ
11 ID NO:23 is a 13 amino acid stretch?

12 MR. DIAMOND: Objection to
13 the form.

14 THE WITNESS: I read -- I
15 read this as if you have residues
16 225 to 237, you are -- let me
17 count again -- 25, 26, 27, 28, 29,
18 30, 31, 32, 33, 34, 35, 36, 37 --
19 13 amino acids.

20 BY MS. STERLING:

21 Q Okay.

22 Number 16, one encoding a
23 humanized (CDR grafted and framework
24 sequence altered) scFv designated
25 5G1.1 scFv CO13, which is SEQ ID

1 ARTURO CASADEVALL, MD, PhD
2 NO:24. At the end of that entry we
3 see, H3 is amino acid residues 225 to
4 237 of SEQ ID NO:24.

5 Do you see that?

6 MR. DIAMOND: Objection to
7 the form.

8 THE WITNESS: I see that the
9 last phrase of the last sentence
10 says that H3 is amino acid
11 residues 225 to 237 of SEQ ID
12 NO:24.

13 But a POSA reading this
14 would have been very cautious with
15 this definition of H3 based on the
16 ambiguity of defining CDRs
17 depending on Chothia and Kabat.

18 BY MS. STERLING:

19 Q But you would agree with me
20 that amino acid residues 225 to 237 of
21 SEQ ID NO:24 is a 13 amino acid range?

22 MR. DIAMOND: Objection to
23 the form.

24 THE WITNESS: I would agree
25 with you that H3 amino acid

1 ARTURO CASADEVALL, MD, PhD
2 residues 225 to 237, that if you
3 count on your fingers, adds up to
4 13.

5 BY MS. STERLING:

6 Q Okay.

7 For number 17, one encoding
8 a humanized (CDR grafted and framework
9 sequence altered) scFv designated
10 5G1.1 scFv CO14, SEQ ID NO:25. And at
11 the end of that entry it states, H3 is
12 amino acid residues 225 to 237 of SEQ
13 ID NO:25.

14 Do you see that?

15 A I see the last sentence that
16 there is a phrase at the end that
17 states, H3 is amino acid residues 225
18 to 237 of SEQ ID NO:25, which a POSA
19 would have read with great caution
20 because a POSA would have known that
21 defining CDR3s is ambiguous depending
22 on which -- which formulation you are
23 using.

24 Q But you would agree with me
25 that amino acid residues 225 to 237 of

1 ARTURO CASADEVALL, MD, PhD
2 SEQ ID NO:25 is a 13 amino acid range?

3 A I would agree with you that
4 when you have the sentence that states
5 amino acid residues 225 to 237, by
6 counting by my fingers, will be 13
7 amino acids.

8 Q Okay. One more construct.
9 18, one encoding a humanized
10 (CDR grafted and framework sequence
11 altered) scFv designated 5G1.1 scFv
12 CO15 (SEQ ID NO:26). And at the end
13 of that entry, H3 is amino acid
14 residues 225 to 237 of SEQ ID NO:26.

15 MR. DIAMOND: I will object
16 to counsel's testimony in the
17 preamble of that question.

18 THE WITNESS: What I --
19 since there's an objection, I will
20 read number 18.

21 One encoding a humanized
22 (CDR grafted and framework
23 sequence altered) scFv designated
24 5G1.1 scFv CO15 (SEQ ID NO:26)
25 wherein CDR L1 is amino acid

1 ARTURO CASADEVALL, MD, PhD
2 residues 26 to 36 of SEQ ID NO:26,
3 CDR L2 is amino acid residues 52
4 to 58 of SEQ ID NO:26, CDR L3 is
5 amino acid residues 91 to 99 of
6 SEQ ID NO:26, CDR H1 is amino acid
7 residues 156 -- I'm sorry, 152 to
8 161 of SEQ ID NO:26, CDR H2 is
9 amino acid residues 176 to 192 of
10 SEQ ID NO:26, H3 is amino acid
11 residues 225 to 237 of SEQ ID
12 NO:26.

13 BY MS. STERLING:

14 Q Okay.

15 You would agree with me that
16 amino acid residues 225 to 237 of SEQ
17 ID NO:26 is a 13 amino acid stretch,
18 correct?

19 A I would agree with you that
20 when you have amino acid residues
21 listed as 225 to 227 [sic] it counts
22 to 13 amino acids.

23 MR. DIAMOND: Counsel, we
24 have been going over an hour,
25 would it be a good time for a

1 ARTURO CASADEVALL, MD, PhD
2 break?

3 MS. STERLING: It could be a
4 good time for a break or I believe
5 I have two or three more questions
6 on Evans if you can --

7 MR. DIAMOND: I need a break
8 myself, if that's all right.

9 MS. STERLING: Let's take
10 one for you, Evan.

11 MR. DIAMOND: I appreciate
12 it. It's been over an hour.

13 (Whereupon a Recess
14 Commenced at 2:01 p.m. and
15 Testimony Recommenced at 2:26
16 p.m.)

17 MS. STERLING: Let's go back
18 on the record.

19 BY MS. STERLING:

20 Q Dr. Casadevall, during the
21 break did you discuss the substance of
22 your deposition testimony with
23 counsel?

24 A No.

25 Q Okay.

1 ARTURO CASADEVALL, MD, PhD

2 Before we took the break we
3 were looking at Evans Exhibit 1007.

4 Do you still have that in
5 front of you?

6 A Yes, I have everything in
7 front of me.

8 Q You were looking at example
9 11.

10 A Okay.

11 Q Which begins on column 42,
12 page 43.

13 Do you have that in front of
14 you?

15 A Example 11 starts in column
16 43.

17 Q Page 43, column 42.

18 A 11?

19 Q I am pointing to example 11.

20 A Oh, sorry.

21 Q It's on column 42.

22 A (Reviewing.) Okay.

23 Q It spans over multiple
24 columns.

25 But you recall this was the

1 ARTURO CASADEVALL, MD, PhD
2 example we were discussing about
3 before the break, correct?

4 A It was the example we were
5 discussing before the break.

6 Q Okay.
7 In column 45, which is still
8 example 11.

9 A Yes.

10 Q Starting around line 24,
11 there's a paragraph that starts, "In
12 accordance with the invention..."

13 Do you see that paragraph?

14 A I see the paragraph that
15 begins, "In accordance with the
16 invention..."

17 Q Okay.
18 Would you like to read that
19 for us in the record, slowly?

20 A In accordance with the
21 invention, match pairs of the variable
22 regions, e.g., a VL and a VH region of
23 the various antibody molecules, Fds
24 and light chains described above may
25 be combined with constant region

1 ARTURO CASADEVALL, MD, PhD
2 domains by recombinant DNA or other
3 methods known in the art to form
4 full-length antibodies of the
5 invention. Particularly, preferred
6 constant regions for this purpose are
7 IgG constant regions which may be
8 altered or constructed of a mixture of
9 constant domains from IgGs of various
10 subtypes, example, IgG1 and IgG4.

11 Q So in this passage, Evans is
12 telling us the variable regions and
13 described above can be made into
14 full-length antibodies by combining
15 those variable regions by constant
16 region domains; is that fair?

17 MR. DIAMOND: Objection to
18 form.

19 THE WITNESS: I think Evans
20 is stating that the fragments --
21 because Evans deals only with
22 fragments -- may be combined
23 with -- with constant regions to
24 form full-length antibodies of the
25 invention.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q Evans, in this paragraph,
4 says that can be done so by
5 recombinant DNA or other methods known
6 in the art.

7 Do you agree?

8 MR. DIAMOND: Objection to
9 form.

10 THE WITNESS: (Reviewing.)
11 In accordance with the invention,
12 matched pairs -- matched pairs of
13 the variable regions, example, a
14 VL and a VH region of the various
15 antibody molecules, Fds, and light
16 chains described above may be
17 combined with constant region
18 domains by recombinant DNA or
19 other methods known in the art to
20 form full-length antibodies...

21 BY MS. STERLING.

22 Q ...of the invention.

23 A ...of the invention.

24 Q So Evans continues to say
25 that, "Particularly preferred constant

1 ARTURO CASADEVALL, MD, PhD
2 regions for this purpose are IgG
3 constant regions."

4 Do you see that?

5 A Are IgG constant regions.

6 Q Evans tells us those IgG
7 constant regions may be unaltered or
8 constructed of a mixture of constant
9 domains from IgGs of various subtypes.

10 Do you see that?

11 MR. DIAMOND: Objection to
12 form.

13 THE WITNESS: I see that it
14 says, Particularly preferred
15 constant regions for this purpose
16 are IgG constant regions, which
17 may be unaltered, or constructed
18 of a mixture of constant domains
19 from IgGs of various subtypes,
20 example, IgG1 and IgG4.

21 BY MS. STERLING:

22 Q So a constant region that
23 was constructed of a mixture of
24 constant domains from IgGs of various
25 subtypes, that would be a hybrid IgG

1 ARTURO CASADEVALL, MD, PhD
2 constant domain, correct?

3 MR. DIAMOND: Objection to
4 form.

5 THE WITNESS: It would
6 depend how you define hybrid. I
7 think -- I think that I would read
8 this as a mixture of constant
9 domains from IgGs of various
10 subtypes.

11 It doesn't use the word
12 hybrid and that's just not here.

13 BY MS. STERLING:

14 Q What does the word mixture
15 convey to a person of ordinary skill
16 in the art in this paragraph?

17 A A POSA would have read this
18 as taking pieces of the constant
19 regions and putting them into -- that
20 would take of various subtypes. But a
21 hybrid is a very specific term.

22 For example, I can read this
23 and say that it would take a piece of
24 IgG1, a piece of IgG2, a piece of IgG3
25 and end up with a multi -- an antibody

1 ARTURO CASADEVALL, MD, PhD

2 that is very different.

3 Q So one example of the
4 mixture of constant domains from IgGs
5 you've just given us a piece of IgG1,
6 a piece of IgG2 and a piece of IgG3;
7 is that correct?

8 MR. DIAMOND: Objection to
9 form.

10 THE WITNESS: I used those
11 examples to -- as an example when
12 you asked me for the purpose --
13 for particularly preferred
14 constant region for this purpose
15 are IgG constant regions which may
16 be unaltered, or constructed of a
17 mixture of constant regions of
18 IgGs of various subtypes.

19 BY MS. STERLING:

20 Q Would another example of a
21 mixture of constant domains from IgGs
22 of various subtypes be some from IgG2
23 and some from IgG3?

24 MR. DIAMOND: Objection to
25 the form.

1 ARTURO CASADEVALL, MD, PhD

2 THE WITNESS: What I think
3 what they are saying is that that
4 you will take -- that you will
5 take a mixture of constant domains
6 and assemble them in some way.

7 It doesn't say anything
8 about hybrids and it's just what
9 it says.

10 BY MS. STERLING:

11 Q Okay. You can set Evans
12 aside.

13 I am going to go back to
14 your declaration, Exhibit 2022, and we
15 are going to stay with the declaration
16 in IPR 2019/00739 for the '504 patent.

17 Is that the one you have in
18 front of you?

19 A Yes, I have the 00739 in
20 front of me.

21 Q Okay.

22 Let's turn to page 142.

23 MR. DIAMOND: Page 142?

24 MS. STERLING: Yes.

25 MR. DIAMOND: Okay.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q On that page there's a
4 header, header 2, SOLIRIS fulfilled a
5 long-felt, unmet need for a treatment
6 of PNH which others failed to satisfy.

7 Are we on the same page?

8 A Sorry. I am now, yes.

9 I am in that page.

10 Q Okay.

11 What standard did you use to
12 formulate your opinion on long-felt
13 need that you provide here in this
14 section?

15 A (Reviewing.) A long-felt,
16 unmet need is a need for which the --
17 you lack -- A therapy for the
18 effective treatment of PNH.

19 Q So is your testimony here in
20 this section, that it's necessary for
21 a therapeutic to be sold to the
22 general public or prescribed to the
23 general public for a long-felt need to
24 be met by that therapeutic?

25 MR. DIAMOND: Objection to

1 ARTURO CASADEVALL, MD, PhD
2 form.

3 THE WITNESS: To have a
4 long-felt, unmet need, I don't
5 think the criteria of selling it
6 to the public is necessary. For
7 example, the government could make
8 it and give it to necessary people
9 and you will still have a
10 long-felt, unmet need.

11 BY MS. STERLING:

12 Q So you are saying it's not
13 necessary for a therapeutic to be
14 prescribed to the public for a
15 long-felt need to be met by that
16 therapeutic.

17 Did I understand you
18 correctly?

19 MR. DIAMOND: Objection to
20 form.

21 THE WITNESS: It's not what
22 I said.

23 BY MS. STERLING:

24 Q Okay.

25 A What I said was, you asked

1 ARTURO CASADEVALL, MD, PhD
2 me whether it was necessary to sell it
3 to the public to fulfill a long-felt,
4 unmet need. And my answer was that
5 the act of selling did not come into
6 that long-felt, unmet need.

7 Q Okay. Let me ask the
8 question again, then.

9 Is it your testimony that
10 it's necessary for a therapeutic to be
11 prescribed to the general public for
12 long-felt need to be met?

13 A This statement, a general
14 public, is itself vague. The general
15 public does not have PNH. The people
16 who have PNH are the patients.

17 Q Okay.
18 Is it then your testimony,
19 then, that it's necessary for a
20 therapeutic to be prescribed to a
21 patient in need of that therapeutic in
22 order for a long-felt need to be met
23 by that therapeutic?

24 MR. DIAMOND: Objection to
25 form.

1 ARTURO CASADEVALL, MD, PhD

2 THE WITNESS: It doesn't
3 have to be prescribed. It can be
4 given.

5 BY MS. STERLING:

6 Q Who would give it?

7 A You know, we are in the
8 middle of a Coronavirus outbreak.
9 Imagine this takes over, we are
10 susceptible to the Coronavirus
11 outbreak. There is not a long-term
12 but definitely an unmet need. It
13 could be that the government gives out
14 antivirals.

15 Q Okay.

16 So then is it your testimony
17 we would need the government to give a
18 therapeutic to patients in the need of
19 that therapeutic for the therapeutic
20 to meet a long-felt need?

21 A It's my opinion that you
22 need an entity to give it out. You
23 have patients who need it, they cannot
24 produce it themselves. So you are
25 going to need someone to give it to

1 ARTURO CASADEVALL, MD, PhD
2 them; whether it is a company, whether
3 it is a non-profit, whether it is a
4 government.

5 Q So it's your opinion that
6 you need an entity to give a
7 therapeutic to a patient who needs
8 that therapeutic in order for that
9 therapeutic to meet a long-felt need;
10 is that accurate?

11 MR. DIAMOND: Objection to
12 form.

13 THE WITNESS: If you have a
14 long-felt, unmet need, you will
15 need something to alleviate the
16 long-felt, unmet need, someone has
17 to provide this material.

18 BY MS. STERLING:

19 Q I am trying to understand
20 what you would consider having to be
21 done or performed in order to meet the
22 long-felt need. So let me ask another
23 question.

24 Are you testifying that a
25 long-felt need can only be met by a

1 ARTURO CASADEVALL, MD, PhD
2 therapeutic once that therapeutic is
3 approved by FDA, for example?

4 MR. DIAMOND: Objection to
5 the form.

6 THE WITNESS: You know, I
7 think approval is a regulatory
8 part of the process. But a
9 long-felt, unmet need, which is
10 what we are talking about,
11 undefined and vague, could be met,
12 for example, drugs are given
13 before they are approved. I
14 forgot what the term is.

15 But oftentimes before
16 approval, they are available to
17 patients who need them. And so
18 approval isn't necessarily an
19 absolute requirement for unfelt --
20 for a long-felt, unmet need.
21 Compassionate use is the term.

22 BY MS. STERLING:

23 Q Okay.

24 So would a publication of a
25 successful clinical trial indicate to

1 ARTURO CASADEVALL, MD, PhD
2 a person of ordinary skill in the art
3 that the therapeutic in that clinical
4 trial could meet a previously unmet
5 need for a therapeutic?

6 MR. DIAMOND: Objection to
7 form. Lack of foundation.

8 THE WITNESS: A drug that
9 does well in a clinical trial
10 would be a very encouraging
11 compound as to whether it fulfills
12 a long-felt, unmet need, is --
13 that is a subsequent criteria.

14 BY MS. STERLING:

15 Q What would you need -- what
16 subsequent criteria would you need to
17 know whether that drug that does well
18 in the clinical trial would meet a
19 previously unmet need?

20 MR. DIAMOND: Objection to
21 form.

22 THE WITNESS: Can you
23 rephrase the question because I am
24 getting a little confused.

25 BY MS. STERLING:

1 ARTURO CASADEVALL, MD, PhD

2 Q Okay.

3 I am going to read your
4 answer back to you from the
5 transcript.

6 You say: A drug that does
7 well in a clinical trial would be a
8 very encouraging compound as to
9 whether it fulfills a long-felt need
10 that is a subsequent criteria.

11 So I was asking you to help
12 me understand what you meant by
13 subsequent criteria. So here is my
14 question again.

15 What subsequent criteria
16 would you need to know, to know
17 whether that drug that did well in the
18 clinical trial would meet a previously
19 unmet need?

20 MR. DIAMOND: Objection to
21 form. And to the extent you
22 misread the witness' testimony.

23 THE WITNESS: Could you tell
24 me -- what you read back to me was
25 what I said.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q Yes.

4 MR. DIAMOND: Well, actually
5 counsel, it wasn't, and the record
6 will show that but go on and ask
7 your question.

8 THE WITNESS: Okay. So
9 please repeat the question.

10 MS. STERLING: Why don't we
11 ask the court reporter to read the
12 question again, if that's Okay.

13 Sorry, we are reading your
14 answer back to you, not the
15 question.

16 (Whereupon Answer is Read
17 Back.)

18 THE REPORTER: A drug that
19 does well in a clinical trial
20 would be a very encouraging
21 compound as to whether it fulfills
22 a long-felt, unmet need, is --
23 that is a subsequent criteria.

24 BY MS. STERLING:

25 Q So that was the answer you

1 ARTURO CASADEVALL, MD, PhD
2 gave me, and I am trying to understand
3 what you meant by subsequent criteria.

4 A Subsequent criteria would be
5 post-trial monitoring. You want to
6 know that there are no long-term
7 effects. That would be an important
8 subsequent criteria.

9 Q So you would need -- you're
10 telling me a person of ordinary skill
11 in the art would need post-trial
12 monitoring before a person of ordinary
13 skill in the art could consider
14 whether the therapeutic at issue would
15 be able to meet a long-felt need?

16 MR. DIAMOND: Objection to
17 form.

18 THE WITNESS: You asked me
19 what other criteria would be
20 needed, and I said that it is
21 standard that all clinical trials
22 include post-trial surveillance,
23 because side effects could happen
24 later and this is why drugs get
25 recalled.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q So you're telling me a
4 therapeutic could not meet a
5 long-felt, unmet need until there's
6 been post-trial surveillance and
7 you're confident the drug is not going
8 to have side effects later?

9 MR. DIAMOND: Objection to
10 form.

11 THE WITNESS: I disagree to
12 your formulation because you could
13 have a long-felt, unmet need, you
14 could have a clinical trial that
15 is highly successful, the reagent
16 can be licensed, and you still
17 have to have post-trial
18 surveillance.

19 BY MS. STERLING:

20 Q So at which point in those
21 events that you just recited to me
22 would the therapeutic had been
23 considered to meet a long-felt need,
24 in your opinion?

25 MR. DIAMOND: Objection to

1 ARTURO CASADEVALL, MD, PhD
2 form.

3 THE WITNESS: For patients
4 with PNH, it would have -- it
5 would have become a fulfilled
6 long-felt, unmet need when it was
7 available for them.

8 BY MS. STERLING:

9 Q And what would have made a
10 therapeutic for PNH available to
11 patients?

12 MR. DIAMOND: Objection to
13 form.

14 THE WITNESS: It would have
15 to -- it would have to do well in
16 the clinical trial. It would have
17 to be produced. It would have to
18 be -- would be available to them
19 from their physicians.

20 BY MS. STERLING:

21 Q And would this be by a
22 physician prescribing the therapeutic
23 to the PNH patient?

24 MR. DIAMOND: Objection.

25 BY MS. STERLING:

1 ARTURO CASADEVALL, MD, PhD

2 Q Is that how the physician
3 would provide this to the patient?

4 MR. DIAMOND: Objection to
5 form.

6 THE WITNESS: You know, the
7 decision on what is a prescription
8 drug, not a prescription drug, I
9 don't know how that is made so I
10 don't know.

11 BY MS. STERLING:

12 Q Okay.

13 Paragraph 273 of your
14 declaration, it's in the same section
15 on page 143, you discuss treatments
16 for PNH in that paragraph. Correct?

17 A In that paragraph 273 --
18 (Reviewing) -- states, "Prior to
19 SOLIRIS, there were no drugs directed
20 to regulation of the body complement
21 system to treat PNH. Symptoms of PNH
22 hemoglobinuria, dark urine caused by
23 periods of acute hemolysis
24 (paroxysms), chronic and potentially
25 disabling fatigue, dysphasia,

1 ARTURO CASADEVALL, MD, PhD
2 recurrent pain, severe anemia,
3 severely impacted patients' quality of
4 life. References AMG1004 at 6,
5 AMG1047 at 2559, AMG 1012 at 1234,
6 ALXN2049 at 122). Patients could also
7 experience life-threatening clots or
8 thrombosis. AMG1004 at 6, AMG1047 at
9 2559, AMG 1012 at 1234, ALXN2049 at
10 12. Because there were no drugs
11 directed to a regulation of
12 complement. As to treatment of PNH
13 patients were forced to rely on other
14 potentially invasive therapies, that
15 could only address individual symptoms
16 of the disease such as blood
17 transfusions. See AMG1004 at 6,
18 AMG1047 at 2559, AMG, 10-12 at 1234.

19 Q So you say in that last line
20 on page 143, "There were therapies
21 that could address individual symptoms
22 of the disease such as blood
23 transfusions."

24 Those therapies were
25 available to patients with PNH prior

1 ARTURO CASADEVALL, MD, PhD
2 to March 2007? Sorry, that therapy.

3 MR. DIAMOND: Objection to
4 form.

5 THE WITNESS: Prior to the
6 availability of SOLIRIS, the
7 treatment of this disease was, as
8 I used the word supportive
9 previously, to mean that you could
10 not do anything about the
11 underlying disease; you had to
12 treat the symptoms. The disease
13 evolved the lysis of red blood
14 cells, that results in anemia.
15 Anemia is treated by blood
16 transfusions.

17 BY MS. STERLING:

18 Q So what -- so -- then
19 potential therapy for PNH prior to
20 March 2007, would have been a blood
21 transfusion; is that fair?

22 MR. DIAMOND: Objection to
23 form.

24 THE WITNESS: That would not
25 have been a therapy for PNH. It

1 ARTURO CASADEVALL, MD, PhD
2 would have been to treat the
3 symptoms. There is a difference.

4 BY MS. STERLING:

5 Q Were there any other
6 therapies available prior to
7 March 2007 that would treat the
8 symptoms of PNH aside from the blood
9 transfusions we just discussed?

10 A That is the only one I
11 cited. I am not a hematologist and I
12 was not treating patients around that
13 time, so I don't know if there were
14 other supportive measures that were
15 used.

16 Q Okay.
17 Do you still have the '504
18 patent in front of you somewhere?
19 Don't put your declaration aside, we
20 are going to come back to it.

21 A '504 patent.

22 Q Let's turn to column 6. In
23 column 6, you will see a header to
24 Overview.

25 Do you see that?

1 ARTURO CASADEVALL, MD, PhD

2 A (Reviewing.) Yes.

3 Q Okay.

4 So that recites, "The
5 present disclosure relates to a method
6 of treating paroxysmal nocturnal
7 hemoglobinuria, ('PNH'). More
8 specifically, to improving certain
9 aspects of quality of life which are
10 incurred in PNH patients and other
11 hemolytic diseases in mammals."

12 Do you see that sentence?

13 A I see the sentence.

14 Q Do you know whether blood
15 transfusions improved certain aspects
16 of the quality of life of patients
17 with PNH?

18 A Blood transfusions treat
19 anemia. Anemia is associated with
20 weakness, difficult breathing.
21 Therefore, the blood transfusions
22 would have improved certain aspects of
23 the quality of life which are impaired
24 in patients with PNH.

25 Q Okay. You can set the '504

1 ARTURO CASADEVALL, MD, PhD

2 patent aside.

3 We are going to return to
4 your '504 declaration. We are going
5 to go to the next section, Section 3,
6 that's on page 146.

7 Let me know when you're
8 there.

9 A I am on 146.

10 Q Okay.

11 So in this Section 3, you
12 provide your opinions about the
13 commercial success of SOLIRIS, right?

14 A SOLIRIS is a commercial
15 success.

16 Q Did you perform an
17 independent analysis to determine
18 whether SOLIRIS is a commercial
19 success?

20 MR. DIAMOND: Objection to
21 form.

22 THE WITNESS: What do you
23 mean by "independent analysis"?

24 BY MS. STERLING:

25 Q Did you perform your own

1 ARTURO CASADEVALL, MD, PhD
2 analysis to determine whether SOLIRIS
3 is a commercial success?

4 MR. DIAMOND: Objection to
5 form.

6 THE WITNESS: I still don't
7 know what analysis you want me to
8 do.

9 BY MS. STERLING:

10 Q How did you conclude SOLIRIS
11 is a commercial success?

12 A There are documents citing
13 that this -- that this drug got
14 praises and it is my understanding
15 that this drug is a commercial
16 success.

17 Q What prices was the drug
18 given?

19 A I have no idea. I do not
20 know what price you sell that.

21 Q So you said there are
22 documents citing --

23 A Oh, you mean prices.
24 Prices. Yes, there are industry
25 praise.

1 ARTURO CASADEVALL, MD, PhD

2 Q That is a separate section.

3 A Right.

4 Q Okay.

5 We are talking about the
6 commercial success.

7 A Right.

8 Q So I'm asking you what
9 analysis you did to come to your
10 conclusion that SOLIRIS is a
11 commercial success?

12 A I did not do an analysis
13 based on drugs. I am a scientist. I
14 am not an economist or an accountant.
15 To me, SOLIRIS is a commercial success
16 based on what I know from being --
17 from being alive and being in the
18 field.

19 Q And what is it that you know
20 from being alive and being in the
21 field that informed you as to whether
22 SOLIRIS was a commercial success?

23 A Well, as I mentioned in the
24 deposition [sic], that other companies
25 are trying to develop biosimilars or

1 ARTURO CASADEVALL, MD, PhD
2 equivalent drugs; therefore, the
3 companies would not be trying to
4 develop this if this was a financial
5 failure.

6 Q So is that your analysis as
7 to how you came to the conclusion that
8 SOLIRIS is a commercial success?

9 MR. DIAMOND: Objection to
10 form.

11 THE WITNESS: I think that's
12 how -- that's one of the
13 indicators by which I form my
14 opinion. The other way in which I
15 form my opinion is that this drug
16 has been on the market at least
17 for a decade, and is a success;
18 therefore, I think that in the --
19 you know, to me that is a
20 commercial success.

21 BY MS. STERLING:

22 Q So when you say the drug is
23 on the market and a success,
24 therefore, it's a commercial success,
25 I am trying to understand what helps

1 ARTURO CASADEVALL, MD, PhD
2 you get to the conclusion that it's a
3 commercial success.

4 Was it merely the approval
5 of the drug?

6 MR. DIAMOND: Objection to
7 form.

8 THE WITNESS: You know, the
9 idea of a commercial success is to
10 some degree subjective because
11 what may be a commercial success
12 to one company, may not be a
13 commercial success to another.

14 What I can tell you is that
15 this drug brought to patients a
16 brand new option for treating it;
17 that the drug has been out there
18 for over a decade; and that other
19 companies have been trying to
20 develop similar drugs. And to me,
21 as I put it all together, from a
22 physician with no training in
23 economics and no training in
24 accounting, that reads to me as a
25 financial success.

1 ARTURO CASADEVALL, MD, PhD

2 BY MS. STERLING:

3 Q Okay.

4 In that section that's
5 entitled, Industry Praise, Section 4,
6 it's on page 147.

7 Let me know when you're
8 there?

9 A Industry praise.

10 Q Okay.

11 What analysis did you do to
12 reach your conclusions about industry
13 praise?

14 A I read -- I read the items
15 that are cited here. I also
16 understand that Alexion has received
17 several significant awards honoring
18 the groundbreaking nature of this
19 development and introduction of
20 SOLIRIS, including the Prix Galien USA
21 2008 award for best biotechnology
22 product. And the Prix Galien France
23 2009 award for the most innovative
24 drug for rare disease. And it cites
25 LX -- LX -- ALXN2020 and ALXN2021.

1 ARTURO CASADEVALL, MD, PhD

2 Q Are you familiar with these
3 Prix Galian awards?

4 A I am not familiar with this
5 awards but I can tell you that -- that
6 they -- the fact that this compound
7 received those awards must be
8 significant.

9 Q Do you know what criteria
10 goes into deciding who gets those
11 awards?

12 A I do not know how the awards
13 are selected.

14 Q Okay.
15 Your next section begins --
16 Section 5, and it's entitled, Copying.
17 And it starts at paragraph 285.

18 Do you see that?

19 A I see 285, Section 5,
20 Copying.

21 Q Okay.

22 And you're copying section
23 spans through paragraph 287, would you
24 agree?

25 A I agree.

1 ARTURO CASADEVALL, MD, PhD

2 Q What standard did you use to
3 reach your conclusions on copying?

4 A I -- you know, I think
5 copying is a form of -- to me, copying
6 is to challenge a patent to develop a
7 similar type of drug, if not the same
8 type of drug. That's to me is my
9 standard of what copying means.

10 Q So what analysis did you
11 perform to determine that other
12 companies are seeking to copy or have
13 already copied eculizumab?

14 A The information that I used
15 to arrive at that conclusion is that
16 Amgen is challenging this patent and
17 that two other companies, Samsung
18 Bioepis and Generium are seeking to
19 copy or have already copied
20 eculizumab, which is known today is a
21 uniquely engineered antibody.

22 Q So your conclusion because
23 Amgen challenged these patents in an
24 IPR, that that is evidence that Amgen
25 has copied these patents?

1 ARTURO CASADEVALL, MD, PhD

2 MR. DIAMOND: Objection to
3 form. Mischaracterizes the
4 witness' testimony.

5 THE WITNESS: All I -- you
6 asked me what evidence and I said
7 to you that we are in the middle
8 of a deposition challenging a
9 patent, and why would you be
10 challenging this patent. And to
11 me, I interpret this as Amgen
12 is -- wants to develop a similar
13 product together with this other
14 companies that are listed here.

15 And this is why we are --
16 and incidentally, this is evidence
17 of commercial -- commercial
18 success. If this had been a
19 failure, I don't think they would
20 be trying to develop the same type
21 of compound.

22 BY MS. STERLING:

23 Q So you included copying in
24 your analysis of commercial success in
25 order to arrive at your conclusion

1 ARTURO CASADEVALL, MD, PhD
2 regarding commercial success; is that
3 fair?

4 MR. DIAMOND: Objection to
5 form.

6 THE WITNESS: When I said to
7 you commercial success, I said to
8 you I am not an economist, I am
9 not an accountant. I go with the
10 big picture of this drug. It's
11 been in the market for 10 years.
12 It met an unmet need in patients
13 with PNH and now we are in the
14 middle of a deposition where one
15 company is challenging a patent.

16 And I put -- I put this all
17 together, as a non-expert, I am
18 not here as an expert on financial
19 success or economics to conclude
20 that this is a financial success.

21 BY MS. STERLING:

22 Q But correct me if I am
23 wrong, you still give a conclusion
24 that SOLIRIS is a commercial success;
25 is that fair?

1 ARTURO CASADEVALL, MD, PhD

2 A My deposition [sic] says,
3 SOLIRIS is a commercial success.
4 SOLIRIS was approved by the FDA on
5 March 16, 2007. So we have 13 years
6 into this, for the treatment of
7 patients with PNH reduced hemolysis,
8 cites three references.

9 I understand that since
10 approval, SOLIRIS commercially
11 successful with over a billion in US
12 sales each year, in each of the last
13 3 years. In my opinion, the
14 commercial success of SOLIRIS is
15 directly linked to the claimed
16 invention of the '504 patent.

17 As I explained in Section
18 VII.F.1 above, the invention of claims
19 1 to 10 of the '504 patent is
20 coextensive with the clear therapeutic
21 benefits of SOLIRIS that are highly
22 valued by physicians and their
23 patients suffering from PNH.

24 Q So I realized you read your
25 declaration to me.

1 ARTURO CASADEVALL, MD, PhD

2 Is this your opinion that
3 SOLIRIS is a commercial success?

4 A The declaration reflects my
5 words. If the words state SOLIRIS is
6 a commercial success, that reflects my
7 opinion and my words.

8 Q So I am trying to still
9 understand what went into your
10 analysis to make the conclusion that
11 SOLIRIS is a commercial success.

12 MR. DIAMOND: Objection to
13 form. Asked and answered.

14 THE WITNESS: What went
15 into -- into my analysis -- well,
16 first of all, as I said to you, I
17 am not an expert in economics,
18 accounting, or pharmaceutical
19 economics. And -- but I am -- I
20 am a physician in the field and
21 I've seen drugs do well and I've
22 seen drugs fail and here we have a
23 drug that has been around for
24 13 years which -- which met an
25 unmet need, and I will conclude

1 ARTURO CASADEVALL, MD, PhD

2 this is a commercial success.

3 MS. STERLING: I thought we
4 have been going about an hour.
5 Why don't we take a break, if
6 that's okay.

7 MR. DIAMOND: Sounds good.

8 (Whereupon a Recess
9 Commenced at 3:05 p.m. and
10 Testimony Recommenced at 3:28
11 p.m.)

12 MS. STERLING: Back on the
13 record.

14 BY MS. STERLING:

15 Q Dr. Casadevall, did you have
16 any discussions about the substance of
17 your deposition with counsel during
18 the break?

19 A No.

20 MS. STERLING: Okay.

21 With that, we have no
22 further questions for you today on
23 your cross-examination part of this
24 proceeding. So thank you for your
25 time.

1 ARTURO CASADEVALL, MD, PhD

2 MR. DIAMOND: So we will
3 take a break to see if we have any
4 questions and -- I don't think it
5 is going to go more than 10, 15 or
6 so.

7 (Whereupon a Recess
8 Commenced at 3:28 p.m. and
9 Testimony Recommenced at 3:41
10 p.m.)

11 MR. DIAMOND: We have no
12 further questions at this time.
13 We are done.

14 (Whereupon Testimony
15 Concluded at 3:41 p.m.)
16
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25

1 A C K N O W L E D G E M E N T

2 STATE OF _____

3 COUNTY OF _____

4

5 I, the undersigned, hereby
 6 certify that I have read the
 7 transcript of my testimony taken under
 8 oath in my deposition; that the
 9 transcript is a true and complete and
 10 correct record of my testimony, and
 11 that the answers on the record as
 12 given by me are true and correct.

13

14 _____

15 ARTURO CASADEVALL, MD, PhD

16

17 Signed and subscribed to
 18 before me

19 This _____ day of

20 _____, 20__.

21

22 _____

23 Notary Public

24

25

C E R T I F I C A T E

I, S. Arielle Santos,
Certified Shorthand Reporter,
Certified LiveNote Reporter do hereby
certify:

That prior to being examined, the
witness named in the forgoing
deposition, was by me duly sworn to
testify the truth, the whole truth,
and nothing but the truth.

That said deposition was taken before me
at the time and place set forth and
was taken down by me in shorthand and
thereafter reduced to computerized
transcription under my direction and
supervision, and I hereby certify the
foregoing deposition is a full, true
and correct transcript of my shorthand
notes so taken.

I further certify that I am neither
counsel for nor related to any party
to said action nor in anywise
interested in the outcome thereof.

S. Arielle Santos

DATE: January 24, 2020 REF: 26639

WITNESS: Arturo Casadevall, M.D., Ph.D.

[illegible]

Arturo Casadevall, M.D., Ph.D.
Subscribed and sworn to before me
this ____ day of _____, 20__.

Notary Public

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