

# **Exhibit 11**

I. Khan

UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF GEORGIA  
ATLANTA DIVISION

Civil Case No. 13-cv-03675-WBH-JCF

UNITED STATES OF AMERICA, )

Plaintiff, )

v. )

UNDETERMINED QUANTITIES OF ALL )

ARTICLES OF FINISHED AND IN-PROCESS )

FOODS, RAW INGREDIENTS (BULK POWDERS, )

BULK CAPSULES) LISTED BELOW, WITH ANY )

LOT NUMBER, SIZE, OR TYPE CONTAINER, )

WHETHER LABELED OR UNLABELED: BLACK )

WIDOW, et al., )

Defendants, )

and )

HI-TECH PHARMACEUTICALS, INC., et al, )

Claimants. )

DEPOSITION OF IKHLAS A. KHAN, Ph.D.

Washington, D.C.

October 26, 2016

Reported by: Mary Ann Payonk; Job No. 114500

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1 I. Khan  
 2  
 3  
 4  
 5 October 26, 2016  
 6 9:41 a.m.  
 7  
 8 Deposition of IKHLAS A. KHAN, Ph.D.,  
 9 held at the offices of the U.S. Department of  
 10 Justice, 450 Fifth Street, N.W., Room 6400  
 11 South, Washington, D.C., pursuant to Notice  
 12 before Mary Ann Payonk, Nationally Certified  
 13 Realtime Reporter and notary public of the  
 14 District of Columbia.  
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 24  
 25

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1 I. Khan  
 2 IKHLAS A. KHAN,  
 3 called as a witness, having been duly  
 4 sworn, was examined and testified as  
 5 follows:  
 6 EXAMINATION  
 7 BY MS. WOOLSON:  
 8 Q. Good morning, Dr. Khan. We met a few  
 9 moments ago, and we're here today to take your  
 10 deposition. Have you -- have you ever been  
 11 deposed before?  
 12 A. Several years ago, yes.  
 13 Q. Okay. And approximately how many  
 14 years?  
 15 A. Seven or eight.  
 16 Q. Okay. And what kind of matter were  
 17 you deposed in?  
 18 A. That was on hoodia case.  
 19 Q. A what?  
 20 A. Hoodia.  
 21 Q. Okay. Since it's been a little while  
 22 since you've been deposed, I'm just going to  
 23 review for you some basic instructions.  
 24 We are here today to take your  
 25 deposition. Although we're in an informal

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1 I. Khan  
 2 APPEARANCES:  
 3 ON BEHALF OF PLAINTIFF:  
 4 JOSHUA DAVENPORT, ESQ.  
 5 United States Food and  
 6 Drug Administration  
 7 10903 New Hampshire Avenue  
 8 Silver Spring, MD 20993  
 9  
 10  
 11 ON BEHALF OF CLAIMANTS HI-TECH PHARMACEUTICALS,  
 12 INC., and JARED WHEAT:  
 13 SHEILA WOOLSON, ESQ.  
 14 EPSTEIN BECKER & GREEN  
 15 One Gateway Center  
 16 Newark, NJ 07102  
 17  
 18 ALSO PRESENT:  
 19 Andrew McDonough  
 20  
 21  
 22  
 23  
 24  
 25

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1 I. Khan  
 2 setting, my questions and your answers are  
 3 being transcribed in a booklet. You're  
 4 answering them under oath. So it's important  
 5 that you make sure you understand the questions  
 6 I'm asking and that you hear them.  
 7 If you don't understand a question,  
 8 let me know and I'll rephrase it. If you don't  
 9 hear it, let me know and I'll repeat it.  
 10 If you answer a question, I'm going  
 11 to assume that you've heard it, understood it,  
 12 and are asking it to -- answering it to the  
 13 best of your ability.  
 14 It's important that you keep all of  
 15 your responses verbal, because the court  
 16 reporter can't take down gestures or nods of  
 17 the head.  
 18 And as the court reporter mentioned  
 19 before we got started, let me finish my  
 20 question before you begin your answer. And  
 21 likewise, I'll let you finish your answer  
 22 before I begin my next question. That way, we  
 23 have a clean record.  
 24 From time to time your attorney may  
 25 interpose an objection to a question. If he

1 I. Khan  
2 does, just refrain from answering until we've  
3 worked it out and he'll instruct you whether to  
4 answer the question.

5 Do you understand those instructions?

6 A. Yes.

7 Q. If you need to take a break at any  
8 time other than when a question's pending, let  
9 me know and we'll take a break. Okay?

10 A. Yes.

11 Q. Great.

12 What did you do to prepare for your  
13 deposition today?

14 A. I'm not sure exactly what you mean.

15 Q. Okay. In order to prepare for your  
16 deposition today, did you review documents?

17 A. Yes.

18 Q. What documents did you review?

19 A. Mostly the expert reports, mine and  
20 Dr. Simone.

21 Q. Okay. Any other documents that you  
22 reviewed that you recall?

23 A. And also look into the manuscripts  
24 provided in the literature that has been cited  
25 just to try -- try to refresh my memory.

1 I. Khan

2 Q. Were there any particular manuscripts  
3 that you looked at that you recall?

4 A. Lately, I look into the manuscript  
5 of -- of Dr. Li and the Fleming paper --

6 Q. Okay.

7 A. -- and some other papers that have  
8 been reported.

9 Q. And other than looking at documents,  
10 did you meet with anyone to prepare for your  
11 deposition?

12 A. Yes.

13 Q. And who did you meet with?

14 A. With the attorneys --

15 Q. Okay.

16 A. -- yesterday.

17 Q. I don't want to know what you  
18 discussed with your counsel.

19 Was there anyone there other than  
20 your counsel and yourself?

21 A. No.

22 Q. Okay. And when did you meet with  
23 your counsel?

24 A. Yesterday.

25 Q. Okay. And can you briefly tell us

1 I. Khan  
2 your educational background?

3 A. I did master's in organic chemistry  
4 from Aligarh -- Aligarh Muslim University in  
5 India, then I did my Ph.D. in pharmaceutical  
6 biology -- biology from the Ludwig Maximilian  
7 University in Munich.

8 Q. Okay. And did you have a thesis when  
9 you were working for your -- toward your Ph.D.?

10 A. Yes.

11 Q. And what was it?

12 A. That was -- it -- it was on  
13 echinacea, so --

14 Q. And --

15 A. -- where we found -- where we found  
16 adulteration in -- in the -- that echinacea  
17 that --

18 THE REPORTER: Where we found?

19 THE WITNESS: Adulteration and  
20 isolated new components reported from --

21 THE REPORTER: I'm sorry, I'm  
22 having a hard time.

23 THE WITNESS: Isolated new  
24 components. Isolated.

25 THE REPORTER: Isolated?

1 I. Khan

2 THE WITNESS: New components.

3 THE REPORTER: New components?

4 Thank you.

5 Q. And let me just say it's fine if,  
6 when you answer my question, if you want to  
7 face the court reporter --

8 A. Okay.

9 Q. -- so she can hear you better, that's  
10 fine. I won't be at all offended.

11 And is it fair to say that your --  
12 your background, your specialty is not  
13 analytical chemistry but, rather, pharmacology?

14 A. No.

15 Q. What would you say your specialty is?

16 A. It's called pharmacognosy.

17 Q. Pharmacognosy? Okay.

18 A. Pharmacognosy, which is a component  
19 include everything from plant chemistry,  
20 natural product chemistry --

21 THE REPORTER: Sorry?

22 THE WITNESS: Natural product  
23 chemistry.

24 THE REPORTER: Thank you.

25 A. Analysis and pharmacology.

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1 I. Khan  
 2 Q. Okay. And can you briefly tell us  
 3 your employment background?  
 4 A. So after doing -- finishing Ph.D. in  
 5 1987 I came to Mississippi working as a  
 6 postdoc, '88-'89. Then I joined a group. It's  
 7 called Swiss Federal Institute of Technology in  
 8 Zurich for three years where I worked on  
 9 isolation of components from plants from Papua  
 10 New Guinea.  
 11 THE REPORTER: From?  
 12 THE WITNESS: Papua New Guinea.  
 13 THE REPORTER: Yes.  
 14 A. And then in December '92, I came to  
 15 Mississippi again where I worked plants like  
 16 taxon. Taxon, T-A-X-O-N.  
 17 And then '95, I got assistant  
 18 professorship. And since then, I'm there.  
 19 Q. Okay. And what is Phytochemical  
 20 Services, Inc.?  
 21 A. It's a -- a spinoff company from  
 22 University of Mississippi and National Center  
 23 for Natural Product Research.  
 24 Q. And what's your role there?  
 25 A. I'm the vice president.

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1 I. Khan  
 2 strike that.  
 3 Does your report also include a copy  
 4 of your current --  
 5 A. CV?  
 6 Q. -- CV?  
 7 A. CV, yes.  
 8 Q. If it would be helpful, you can turn  
 9 to that and -- and take a look at it as we talk  
 10 about your background. If I can find it, I'll  
 11 turn to it too.  
 12 Who else works with you at -- at  
 13 Phytochemical Services, Inc.?  
 14 A. Mahmoud ElSohly, the president.  
 15 Q. Okay. And anyone else?  
 16 A. And Waseem Gul --  
 17 Q. And --  
 18 A. -- and --  
 19 Q. -- what's his role?  
 20 A. Analysis and communication with the  
 21 people who send samples.  
 22 Q. Okay. Is there anyone else that  
 23 works there?  
 24 A. PSI is not a -- a -- a company that  
 25 can ask for people to help since there is no

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1 I. Khan  
 2 Q. And how long have you been vice  
 3 president?  
 4 A. Since the inception.  
 5 Q. And when was the inception? I'm  
 6 sorry. If you -- if you said it, I missed it.  
 7 What date was the inception date?  
 8 A. Oh, I -- must have been 2009. I am  
 9 not sure what the date --  
 10 Q. I'm going --  
 11 A. -- was at --  
 12 Q. -- to show you -- go ahead.  
 13 A. Yeah.  
 14 (Khan Exhibit No. 1 was marked for  
 15 identification.)  
 16 BY MS. WOOLSON:  
 17 Q. I'm going to show you what's been  
 18 marked as Exhibit 1.  
 19 MS. WOOLSON: And I'll pull out a  
 20 copy for you, counsel.  
 21 Q. Just let me know when you're ready to  
 22 proceed.  
 23 Have you seen Exhibit 1 before?  
 24 A. Yeah. This is my report.  
 25 Q. At the back of your report -- or,

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1 I. Khan  
 2 full-time employee other than Waseem.  
 3 Q. Okay. So -- so in answer to my  
 4 question, then, those are the only three  
 5 employees, yourself, Dr. ElSohly, and Waseem?  
 6 A. Part of the company.  
 7 Q. When you say "part of the company,"  
 8 what do you mean?  
 9 A. I would not call them employee.  
 10 Q. So you -- would you call them  
 11 interns?  
 12 A. Yeah.  
 13 Q. And where do you get the interns?  
 14 A. Well, these people are not working  
 15 full-time for PSI.  
 16 Q. Understood. These people who are --  
 17 are -- let's back up. When you say they're not  
 18 working full-time, are they part-time  
 19 employees, so they're getting paid for  
 20 part-time --  
 21 A. So --  
 22 Q. -- work?  
 23 A. -- Dr. ElSohly is the president.  
 24 Q. Uh-huh.  
 25 A. And he's not employed per se right

1 I. Khan  
 2 now because he does not get paid.  
 3 Q. Okay.  
 4 A. I'm the vice president. I do not get  
 5 paid. So we are not paid employees.  
 6 Q. Okay.  
 7 A. It is a -- a small startup company.  
 8 Waseem Gul get partially paid.  
 9 Q. He gets partially paid? You mean he  
 10 gets paid for part-time work?  
 11 A. Yeah.  
 12 Q. Okay. Any other employee or person  
 13 get paid for part-time work there?  
 14 A. I believe some other people get paid,  
 15 but I don't remember on what basis because I --  
 16 I -- I -- I don't know the finance. Mahmoud  
 17 ElSohly might answer that question.  
 18 Q. Okay. And so what are your duties as  
 19 vice president?  
 20 A. This is a -- my duties is that we can  
 21 perform the analysis on anything that people  
 22 inquire and we say that it can be done over  
 23 there. So yes, my duties are can or cannot be  
 24 done, or this is something that we should be  
 25 doing it. It -- it fits with our expertise.

1 I. Khan  
 2 Q. And how many clients, or customers  
 3 shall we say, does Photochemical Services have  
 4 now?  
 5 A. I cannot give you exact number.  
 6 Q. Can you estimate?  
 7 A. We do not have permanent clients.  
 8 How many requests we have got for work for I  
 9 show as several.  
 10 Q. Well, let me rephrase the question.  
 11 Are -- is -- is Phytochemical  
 12 Services, Inc. currently performing services  
 13 for any clients?  
 14 A. Yes.  
 15 Q. How many?  
 16 A. Again, I can't give you an exact  
 17 number.  
 18 Q. Can you estimate?  
 19 A. I will say three to five.  
 20 Q. Can you tell me who they are?  
 21 A. No. I -- I don't remember.  
 22 Q. Can you tell me if any of them are  
 23 governmental agencies?  
 24 A. No, I don't think so.  
 25 Q. To your knowledge, has Phytochemical

1 I. Khan  
 2 Services, Inc. done work for any governmental  
 3 agencies?  
 4 A. They have done work for -- but that's  
 5 not a government agency, USADA.  
 6 Q. Done work for who?  
 7 A. USADA.  
 8 Q. US --  
 9 A. U.S. Anti-Doping Agency.  
 10 Q. Okay.  
 11 THE REPORTER: Repeat.  
 12 THE WITNESS: U-S-A -- USADA.  
 13 U-S-A -- U.S. Anti-Doping Agency.  
 14 USADA.  
 15 THE REPORTER: Well, I can get it  
 16 later, but I -- I'm not understanding.  
 17 But I will do research later to -- to  
 18 find those terms.  
 19 MS. WOOLSON: That's okay.  
 20 Q. And what type of analysis has  
 21 Photochemical Services performed for -- for  
 22 U.S. for -- the U.S. Anti-Doping Agency?  
 23 A. The question that whether DMAA is  
 24 present in geranium or not.  
 25 THE REPORTER: I -- I -- I'm sorry,

1 I. Khan  
 2 I -- I'm struggling with every answer,  
 3 and I -- I'm -- I apologize for that,  
 4 but I --  
 5 THE WITNESS: Let -- let me sit  
 6 close to you.  
 7 THE REPORTER: Well, I -- but --  
 8 but we -- sitting close, I just -- I'm  
 9 struggling with every answer. And every  
 10 single word is important, so I -- I hate  
 11 to stop on every one. I -- I don't know  
 12 what else to do because I -- I didn't  
 13 understand your answer at all.  
 14 MR. DAVENPORT: You can sit back  
 15 here, Dr. Khan. The -- the agency is  
 16 the United States Anti-Doping Agency. I  
 17 don't want to --  
 18 THE REPORTER: The question was  
 19 what type of analysis, and so --  
 20 THE WITNESS: I said DMAA --  
 21 THE REPORTER: Yes.  
 22 THE WITNESS: -- in geranium  
 23 plants.  
 24 THE REPORTER: Engineering  
 25 implants?

1 I. Khan  
 2 THE WITNESS: No.  
 3 THE REPORTER: See, I -- I am  
 4 really --  
 5 MS. WOOLSON: I understand. It was  
 6 DMAA in geranium, like the flower.  
 7 THE REPORTER: Oh. I don't want  
 8 you to be mad at me, but we're going to  
 9 be this way all day long because I'm  
 10 struggling so hard to understand.  
 11 MS. WOOLSON: I understand.  
 12 Everybody's doing the best they can.  
 13 It's all we can do.  
 14 THE REPORTER: Okay.  
 15 MR. DAVENPORT: That's what he  
 16 said.  
 17 THE REPORTER: Okay.  
 18 MR. DAVENPORT: That was counsel's  
 19 interpretation, "DMAA" and "geranium."  
 20 THE REPORTER: Okay. Thank you.  
 21 BY MS. WOOLSON:  
 22 Q. And how -- strike that.  
 23 When did Phytochemical Services, Inc.  
 24 start doing analysis for the USADA regarding  
 25 DMAA in geranium plants?

1 I. Khan  
 2 Leaving aside the Phytochemical  
 3 Services, Inc. analysis that we just discussed,  
 4 have you personally done any analyses for any  
 5 governmental agency or -- or anti-doping agency  
 6 regarding DMAA in geranium plants?  
 7 A. Yes. We analyze -- the question to  
 8 answer whether it's there or not, we did do  
 9 analysis of DMAA.  
 10 Q. And by whom were you hired to do that  
 11 analysis?  
 12 A. We were not hired by anybody.  
 13 Q. Okay. Perhaps I misunderstood,  
 14 because my first question was did you  
 15 personally do any analysis for any governmental  
 16 agency or any -- any anti-doping agency  
 17 regarding DMAA in geranium plants aside from  
 18 the Phytochemical Services work that you talked  
 19 about. And you said yes.  
 20 A. Yes. So if you look at the first  
 21 paper, we did analyze the samples to confirm  
 22 the identity of DMAA.  
 23 Q. Uh-huh.  
 24 A. That work was done in the center but  
 25 it was not paid by -- well, not -- or we were

1 I. Khan  
 2 A. If I recall, it must have been around  
 3 2011.  
 4 Q. And is that work continuing through  
 5 today?  
 6 A. No.  
 7 Q. When did it end?  
 8 A. After first publication.  
 9 Q. And when you say "first publication,"  
 10 what do you mean?  
 11 A. The -- the ElSohly paper which was  
 12 reported DMAA in the first report, and that was  
 13 partially sponsored by USADA.  
 14 Q. Okay.  
 15 A. That's -- that's -- that's the --  
 16 that's the end of the relationship.  
 17 Q. And we'll come back to that report a  
 18 little bit later.  
 19 A. Uh-huh.  
 20 Q. Other than USADA, are there any other  
 21 agencies or clients for whom Phytochemical  
 22 Services, Inc. has done research or analysis on  
 23 DMAA?  
 24 A. No.  
 25 Q. And how about you personally?

1 I. Khan  
 2 not hired, center was not hired to do the DMAA  
 3 analysis. It's just a question of scientific  
 4 curiosity and finding whether it is there or  
 5 not. That's what we did.  
 6 Q. And -- and this is still the first  
 7 paper that you're talking about?  
 8 A. Yeah.  
 9 Q. Okay. Who funded the research that  
 10 was done in that first paper?  
 11 A. In center we get funding from many  
 12 agencies.  
 13 Q. Which ones funded the research in the  
 14 first paper?  
 15 A. That's the USADA.  
 16 Q. Okay. So USADA funded the research  
 17 that was in the first paper, the first ElSohly  
 18 paper?  
 19 A. Yeah.  
 20 Q. Okay. What about other studies or  
 21 analysis of DMAA subsequent to the first paper?  
 22 A. That's the second paper.  
 23 Q. Okay. And the second paper, was that  
 24 undertaken -- well, strike that.  
 25 Who undertook the analysis for that

Page 22

1 I. Khan  
 2 second paper?  
 3 A. That's a multicenter study so it --  
 4 it was done by four centers.  
 5 Q. Okay. And who provided the funding  
 6 for that study?  
 7 A. No direct funding for that.  
 8 Q. No one provided funding for that  
 9 study?  
 10 A. No direct funding.  
 11 Q. So where did the money come from to  
 12 support the study?  
 13 A. We -- we are part of the National  
 14 Center for Natural Product Research where we  
 15 have mandate to do the research. And the  
 16 research funding as a whole is come from multi  
 17 institutions. So basically -- basically when  
 18 we talk about a project, a specific project, a  
 19 specific question to answer is funded.  
 20 But general scientific question,  
 21 that's very difficult to say where the funding  
 22 is coming from because we have funding coming  
 23 from states, funding coming from -- from USDA.  
 24 Funding is coming from NIH, funding is coming  
 25 from FDA.

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1 I. Khan  
 2 Q. We talked about the first paper and  
 3 the second paper briefly. Was there any other  
 4 research or analysis or studies that you  
 5 personally have been involved in regarding  
 6 DMAA?  
 7 A. Yeah. We had subsequently published  
 8 a paper on different technique called DART.  
 9 Q. Uh-huh.  
 10 A. That paper has been published. And  
 11 then we have published a paper of biological  
 12 activity for insecticidal property. That paper  
 13 has been published too, but that was not about  
 14 DMAA.  
 15 Q. So the paper on insecticidal  
 16 properties was not about DMAA?  
 17 A. Specifically.  
 18 Q. Okay. And the third paper that you  
 19 discussed, the -- the -- I think you called it  
 20 DART --  
 21 A. DART.  
 22 Q. -- analysis, what agency or agencies  
 23 provided funding for that analysis?  
 24 A. Again, this -- this is part of the  
 25 center so it's -- it's not can be connected

Page 23

1 I. Khan  
 2 Q. So you said funding is coming from  
 3 USD --  
 4 A. A.  
 5 Q. USDA, NIH and FDA?  
 6 A. Yeah.  
 7 Q. Okay. Aside from those three  
 8 agencies, what other funding did you receive  
 9 that underwrote the analysis that was performed  
 10 in the second paper?  
 11 A. If you look at the second paper,  
 12 there's no acknowledgment of a particular  
 13 agency.  
 14 Q. You said there was an acknowledgment  
 15 of a particular agency?  
 16 A. No.  
 17 Q. No? Then I'm sorry, I didn't  
 18 understand.  
 19 A. No -- no acknowledgment of a  
 20 particular agency.  
 21 Q. That wasn't my question.  
 22 The question was, other than those  
 23 three agencies we've just talked about, were  
 24 there any other agencies that provided funding?  
 25 A. No.

Page 25

1 I. Khan  
 2 to --  
 3 Q. Okay.  
 4 A. -- funding.  
 5 Q. So let's talk about the center then  
 6 very briefly.  
 7 A. Okay.  
 8 Q. You've mentioned -- you said you had  
 9 a mandate, the center had a mandate.  
 10 A. Yeah.  
 11 Q. Who is the mandate from?  
 12 A. That's -- it's a center mandate.  
 13 It's a vision that we should discover and  
 14 develop natural product for the benefit --  
 15 THE REPORTER: Develop?  
 16 THE WITNESS: Develop natural  
 17 products.  
 18 THE REPORTER: Yes.  
 19 THE WITNESS: For the benefit of  
 20 health and agriculture.  
 21 Q. Okay. So this was a -- a --  
 22 A. Yeah.  
 23 Q. -- self-imposed mandate by the  
 24 center.  
 25 A. Yeah.



1 I. Khan

2 Q. Okay. And how does the center fund  
3 the studies that it does regarding this  
4 mandate?

5 A. Funding wherever we can get the  
6 funding, but major funding comes from  
7 Mississippi State, Department of Agriculture,  
8 of NIH, FDA, and -- and DOD, and some  
9 industrial partner if they want us to work with  
10 us. So, I mean, it changes year to year,  
11 but --

12 Q. And of those sources you've just  
13 listed for me, Mississippi State, Department of  
14 Agriculture, NIH, FDA, and DOD, who provides  
15 the majority of the funding for the center?

16 A. These are the major one. I -- I will  
17 not say the one is major. It mean it -- how it  
18 distributed to the budget. The major portion  
19 of the funding comes from this agency. You  
20 would like to have numbers?

21 Q. Yes.

22 A. That can be provided. I don't  
23 remember.

24 Q. Okay.

25 A. If -- if it is --

1 I. Khan

2 Q. We will make a request in writing on  
3 that.

4 Do you know the percentages, the  
5 relative percentages, if not the numbers?

6 A. I think it will be better to deal  
7 with the number instead of percentages. As I  
8 said, it's always changing year to year. It  
9 depends on the funding, so I do not want to  
10 quote anything which is not right.

11 Q. Would you agree that the majority of  
12 the funding for the center comes from those  
13 four agencies I just identified? Yes?

14 A. That's right.

15 Q. And what is your role at the -- the  
16 center?

17 A. Center, I'm right now associate  
18 director, one of the associate director.

19 Q. How many associate directors are --

20 A. Two.

21 Q. -- there?

22 A. Two.

23 Q. Two? Who's is the other one?

24 A. David Pasco.

25 Q. When did you -- what are your duties

1 I. Khan

2 as associate director?

3 A. I take care of mostly chemistry part,  
4 analytical part, medicine plant garden, and --

5 THE REPORTER: Medicine?

6 THE WITNESS: Plant garden. Plant.

7 THE REPORTER: Plant? Garden?

8 THE WITNESS: Yes.

9 THE REPORTER: Thank you.

10 A. And all the necessary things which  
11 come with the --

12 Q. And -- and the --

13 A. With the --

14 Q. I'm sorry. When you say you --  
15 you -- you're responsible for those areas, what  
16 do you mean? What do you actually do to be  
17 responsible for those areas?

18 A. Of course I'm here to keep looking at  
19 the funding opportunities, plus we want to make  
20 sure that all the people are working in a -- in  
21 a well-defined or in a -- in a cohesive manner  
22 like any organization, and to make sure the  
23 people who are in the lab have what they are  
24 supposed to have to get the job done. So  
25 that's administrative position's all about.

1 I. Khan

2 Q. Okay. And how many people work at  
3 the center?

4 A. Center, we have I will say around 80.  
5 It fluctuate. Plus we have Department of  
6 Agriculture people in the same building, which  
7 is around 30, 35. So total, we have more than  
8 100. I would say close to 120 people.

9 Q. And what -- what's the relationship  
10 between the -- the folks that work for the  
11 center and the folks that work for the  
12 agricultural department?

13 A. We -- their focus, looking for  
14 natural product for using --

15 THE REPORTER: Looking for?

16 THE WITNESS: Natural products.

17 THE REPORTER: Natural products?

18 A. For trying -- trying to find the  
19 natural sources for herbicides, pesticides, and  
20 from natural -- or insecticide from the natural  
21 sources. So they -- they are -- their job is  
22 also doing science in natural product --

23 THE REPORTER: Also doing?

24 THE WITNESS: Also looking for  
25 natural product for agriculture uses.

1 I. Khan  
 2 THE REPORTER: Thank you.  
 3 A. And our one is more focused on the  
 4 health side, looking for health benefits.  
 5 Q. So do the people who work for the  
 6 center actually collaborate with the people who  
 7 work for the Department of Agriculture on  
 8 studies?  
 9 A. Yes.  
 10 Q. Are you an editor or an advisor to  
 11 any analytical chemistry journal?  
 12 A. I have to look into that. I was  
 13 coeditor of Planta Medica, which does include  
 14 analysis of analytical component, but it's  
 15 called Planta Medica.  
 16 Q. Plant America?  
 17 A. Planta Medica.  
 18 Q. Planta Medica? Thank you.  
 19 Okay. And other than Planta Medica,  
 20 can you think of any other --  
 21 A. Yes, I'm --  
 22 Q. -- journal that --  
 23 A. -- I am on the editorial board of  
 24 several one. So specifically which one is  
 25 analytical one, I have to look at the list to

1 I. Khan  
 2 that the discipline of analytical chemistry is  
 3 of itself its own special unique -- strike  
 4 that.  
 5 Would you agree with me that the  
 6 discipline of analytical chemistry is its own  
 7 unique specialty?  
 8 MR. DAVENPORT: Objection, form.  
 9 You can answer.  
 10 THE WITNESS: I'm sorry.  
 11 MR. DAVENPORT: Yeah, you -- I'm  
 12 sorry. You may answer.  
 13 THE WITNESS: Okay.  
 14 MR. DAVENPORT: I was just  
 15 interposing an objection to the form of  
 16 the question.  
 17 THE WITNESS: Yeah.  
 18 A. Analytical chemistry, you have to be  
 19 specific when you mean analytical chemistry.  
 20 It -- it -- analytical chemistry itself can be  
 21 divided in many, many, many portions of  
 22 analytical chemistry.  
 23 Analytical chemistry does not only  
 24 mean analysis of natural product. Analytical  
 25 chemistry has many form and shapes and

1 I. Khan  
 2 tell you --  
 3 Q. Okay.  
 4 A. -- to specify.  
 5 Q. Okay.  
 6 A. If you look at this page, editorial  
 7 and advisory boards, many of them listed,  
 8 including USP. I'm part -- on Planta Medica, I  
 9 work for USP which deals on the monograph,  
 10 which are analytical. At AOAC, committee on  
 11 dietary supplement, expert committee. I have  
 12 been part of the product quality working group  
 13 which now they call NCCIH.  
 14 Q. So of these publications you've  
 15 identified, is it your testimony that these  
 16 publications are focused primarily on  
 17 analytical chemistry? Or is it that analytical  
 18 chemistry is a portion of what those journals  
 19 focus on?  
 20 A. As I described the pharmacognosy,  
 21 when we talk about plant, especially the  
 22 medicinal plants, it has all the component from  
 23 botany, analytical chemistry, isolation of  
 24 components, and also pharmacology.  
 25 Q. Okay. And would you agree with me

1 I. Khan  
 2 disciplines which can be broken down into  
 3 different expertise. So it's a very broad  
 4 question to -- to answer.  
 5 Q. Okay. Have you ever testified as an  
 6 expert before?  
 7 A. As I mentioned, I was part of this  
 8 deposition.  
 9 Q. So if we received a -- a statement  
 10 saying that you had never testified as an  
 11 expert before, that would be incorrect?  
 12 A. Last --  
 13 MR. DAVENPORT: Objection to the  
 14 form of the question. Assumes facts not  
 15 in evidence. You can answer.  
 16 A. Again, at the beginning I mentioned I  
 17 was deposed in -- several years ago.  
 18 Q. Yes. And do you recall the name of  
 19 the case?  
 20 A. Not on top of my head.  
 21 Q. And do you recall for whom you were  
 22 acting as an expert?  
 23 MR. DAVENPORT: Objection to the  
 24 form of the question.  
 25 A. A law firm.

1 I. Khan  
 2 Q. A law firm?  
 3 And do you know who your client was?  
 4 A. The law firm who asked me to depose  
 5 as expert in that case. I don't remember the  
 6 name and detail.  
 7 Q. Do you remember the name of the law  
 8 firm?  
 9 A. Not exactly. That was earlier, so --  
 10 but yeah, that information can be made  
 11 available.  
 12 Q. And do you recall -- you said you  
 13 were asked to testify as an expert. What was  
 14 the subject matter of your testimony?  
 15 A. As I mentioned in the beginning,  
 16 subject matter was hoodia, H-O-O-D-I-A.  
 17 Q. And do you know -- well, let me back  
 18 up.  
 19 Do you know if you were being asked  
 20 to testify on behalf of a private company or a  
 21 governmental agency?  
 22 A. No.  
 23 Q. You don't know?  
 24 A. I would -- it was from the lawsuit  
 25 from the law firm, so it was not a government

1 I. Khan  
 2 agency.  
 3 Q. But you don't recall the name of the  
 4 party for whom you were acting as an expert?  
 5 A. Not right now.  
 6 Q. Okay. Do you recall what the issue  
 7 was?  
 8 A. Hoodia.  
 9 Q. Well, what about it?  
 10 A. Hoodia is present in the product or  
 11 not.  
 12 Q. And what was the product?  
 13 A. I don't know.  
 14 Q. Do you have records regarding that  
 15 testimony?  
 16 A. No, I don't have it.  
 17 Q. Do you have a copy of your deposition  
 18 transcript?  
 19 A. Not with me.  
 20 Q. What was that?  
 21 A. Not with me.  
 22 Q. Not with you here, but do you have it  
 23 at -- at -- at your office or at your home?  
 24 A. I'm sure it can be obtained if you  
 25 ask for it, but I -- I do not have any -- no.

1 I. Khan  
 2 No, I don't have it with me.  
 3 Q. Okay. Couple more questions for you  
 4 about the center.  
 5 A. Yeah, uh-huh.  
 6 Q. Do you work with people at FDA in  
 7 your role as associate director at the center?  
 8 A. Yes.  
 9 Q. And who do you work with?  
 10 A. Specifically, we -- we work with  
 11 CFSAN. CFSAN is -- is a part of FDA's -- C,  
 12 yeah, CFSAN, C.  
 13 THE REPORTER: I can get the  
 14 spellings later.  
 15 THE WITNESS: Yeah.  
 16 THE REPORTER: I'll mark them to  
 17 get them later.  
 18 Q. And what does that group do?  
 19 A. This is a food safety group within  
 20 the FDA.  
 21 Q. And who at FDA personally, names of  
 22 people do you know that --  
 23 A. Right now, the program officer is  
 24 Cara Welch, C-A-R-A, W-E-L-C-H.  
 25 Q. Okay. Anybody else that you work

1 I. Khan  
 2 with at FDA?  
 3 A. She is our program officer.  
 4 Q. And when you say "program officer,"  
 5 what do you mean?  
 6 A. She -- she's a program officer. I  
 7 mean, she's the director responsible for making  
 8 sure that projects are -- are funded and  
 9 working and -- and accordingly. I mean, just  
 10 an oversight officer in any government agency.  
 11 That's her role.  
 12 Q. Does anyone at FDA review any  
 13 publications or studies or potential articles  
 14 that are prepared by the center before they're  
 15 published?  
 16 A. General practice is that we send the  
 17 publication to Cara Welch to look at it.  
 18 Q. Do you know what Cara Welch does with  
 19 it? Does she send it to someone else?  
 20 A. I don't know internal process.  
 21 Q. Okay. And how long has Cara Welch  
 22 been the program officer?  
 23 A. I will say three years. It might be  
 24 plus/minus couple of months, but around three  
 25 years.

1 I. Khan  
 2 Q. Okay. And did you deal with someone  
 3 in the -- the role of program officer before  
 4 Ms. Welch?  
 5 A. Yes.  
 6 Q. And do you know who that was?  
 7 A. Daniel Fabricant.  
 8 Q. And did you follow the same policy of  
 9 sending him articles or studies to be reviewed  
 10 before they were published?  
 11 MR. DAVENPORT: Objection to the  
 12 form of the question. You can answer.  
 13 A. No.  
 14 Q. So this process of -- of having -- of  
 15 sending an article to FDA to review before  
 16 publication started with Ms. Welch?  
 17 MR. DAVENPORT: Objection to the  
 18 form of the question. Assumes facts.  
 19 You can answer.  
 20 A. Anytime that we write publications  
 21 that -- I mean, it was done but not it was done  
 22 that every paper was provided to them.  
 23 Q. I'm sorry, what did you say?  
 24 A. It was done but not on regular basis.  
 25 Q. So what would determine when you

1 I. Khan  
 2 would provide a copy of a study or an article  
 3 to them before it was published?  
 4 A. Oh, the content of the paper.  
 5 Q. And what about the content of the  
 6 paper?  
 7 A. I mean, it's -- some paper is --  
 8 have -- might have some quality issues  
 9 identified by FDA. We just wanted to make sure  
 10 that that was coming since they are being  
 11 acknowledged.  
 12 Q. And of the -- the three papers we've  
 13 discussed regarding DMAA, were any of those  
 14 supplied to FDA before they were published for  
 15 review?  
 16 A. No. That was not funded by FDA so  
 17 they did not.  
 18 Q. What about NIH?  
 19 A. NIH does not require to review  
 20 papers.  
 21 Q. Well, you said "NIH does not require  
 22 to review papers." Does FDA require to review  
 23 papers?  
 24 A. No.  
 25 Q. Okay. So then did NIH -- have you

1 I. Khan  
 2 sent any papers -- strike that.  
 3 Has the center sent any papers or  
 4 studies or articles to NIH to be reviewed  
 5 before they were published?  
 6 A. No.  
 7 Q. How about the U.S. Anti-Doping  
 8 Association? Has the center sent any papers,  
 9 articles, or studies to the U.S. Anti-Doping  
 10 Agency to review before they were published?  
 11 A. Except the paper which was partially  
 12 sponsored by them, no other paper has been now  
 13 reviewed by USADA.  
 14 Q. And that was the first paper we  
 15 talked about?  
 16 And did the U.S. Anti-Doping Agency  
 17 make any revisions to that first paper, to your  
 18 knowledge?  
 19 A. Revisions mean editing?  
 20 Q. Uh-huh, yes.  
 21 A. They probably contributed to it. I  
 22 can't specifically recall what corrections or  
 23 editing they made.  
 24 Q. And the -- including this first DMAA  
 25 study, the -- of the studies that we've

1 I. Khan  
 2 discussed, to your knowledge, were those --  
 3 were those, the results of those studies,  
 4 papers that were to be published, were they  
 5 reviewed by anyone outside of the center or  
 6 Phytochemical Services, Inc. or your research  
 7 group before they were published, leaving aside  
 8 the journal to which they might have been  
 9 submitted?  
 10 A. Do you mean the publication reviewed  
 11 among ourselves?  
 12 Q. So what I'm asking is, is there  
 13 anyone outside of the group of people who  
 14 actually performed the research for those  
 15 papers? Did anyone review those articles or  
 16 studies before they were submitted for  
 17 publication?  
 18 A. "Outside" means?  
 19 Q. Other than the scientists who  
 20 actually were performing the research.  
 21 A. Yeah. So the first paper was where  
 22 the USADA was -- gave the editing, no one else.  
 23 Q. And what about the other DMAA  
 24 studies?  
 25 A. DMAA studies were not shared by

1 I. Khan  
2 anybody.  
3 Q. Who do you work with at NIH?  
4 A. Right now I do not have any NIH  
5 direct funding. I was part of a center grant  
6 which was funded through University of Illinois  
7 at Urbana-Champaign. And Craig Hopp, H-O-P-P,  
8 was our program officer.  
9 Q. And with whom do you work at the  
10 Department of Defense?  
11 A. I directly don't work at. This is  
12 a -- a project that our director, Larry Walker,  
13 is director. He's the PI and he communicates  
14 with them. I do not have personal or direct  
15 communication with them.  
16 Q. Okay. You said this person's name is  
17 Lanny Walker?  
18 A. Larry, L-A --  
19 Q. Oh, okay.  
20 A. -- R-R-Y.  
21 Q. Okay. Larry Walker.  
22 A. He's the director of the center.  
23 Q. Last but not least, who do you work  
24 with at the Department of Agriculture?  
25 A. Again, Larry Walker is the director.

1 I. Khan  
2 yes.  
3 Q. When you say "for one of them," what  
4 do you mean?  
5 A. Because in some paper it say  
6 1,3-dimethylamylamine and 1,4-dimethyl, so --  
7 Q. Do you understand them to be two  
8 different isomers of the same compound?  
9 A. They're two different components.  
10 Q. Two different compounds? Okay.  
11 And when you've been talking about  
12 DMAA, what are you referring to, 1,3 or 1,4?  
13 A. 3. 1,3.  
14 Q. Okay. So just to make everybody's  
15 life easier going forward, we're going to call  
16 it DMAA, and we'll know that we're talking  
17 about 1,3-dimethylhexanamine. Okay.  
18 If we need to distinguish that, we'll  
19 talk about the other one as 1,4 just so we're  
20 clear.  
21 A. Okay.  
22 Q. What is a chiral molecule?  
23 A. Chiral molecule, any -- any carbon  
24 which has a -- four different bonding  
25 connections can create a chirality.

1 I. Khan  
2 He's the PI of this cooperative development and  
3 I'm one of the co-PI. So he's the one who  
4 actually deals with direct relationship with  
5 USDA. I don't have any directly.  
6 Q. So that means you don't know the  
7 answer to my question about who's dealt with?  
8 MR. DAVENPORT: Objection to the  
9 form of the question. You can answer  
10 the question.  
11 Q. I mean, do you know the name of the  
12 people that the center deals with at the  
13 Department of Agriculture?  
14 A. No, I don't.  
15 Q. Okay. We've mentioned a few times  
16 this chemical, DMAA. Can you give me the --  
17 the common chemical name for it?  
18 A. Methylhexanamine.  
19 Q. And when I've seen the -- the  
20 chemical described in literature, it talks  
21 about 1,3?  
22 A. 1,3.  
23 Q. 1,3-dimethylhexanamine? Is that the  
24 proper name?  
25 A. For one of them which is reported,

1 I. Khan  
2 Q. So let me paraphrase to see if we're  
3 on the same page.  
4 My understanding of chirality is that  
5 it's talking about a carbon bond that has four  
6 different connections.  
7 A. Exactly.  
8 Q. Okay. And sometimes they talk --  
9 they talk about chiral molecules as having  
10 handedness, right-handed, left-handed --  
11 A. That's on --  
12 Q. -- so it's superimposable mirror  
13 images. Okay.  
14 Is DMAA chiral?  
15 A. Yes.  
16 Q. And how many chiral centers does it  
17 have?  
18 A. Two.  
19 Q. Okay. And we talked about sort of  
20 the mirror images, the -- the -- the right-hand  
21 and the left-hand images. Do they have a name,  
22 that pair of images?  
23 A. It's called enantiomers.  
24 Q. If you have a chiral molecule that  
25 has two chiral centers, you'll have two pair of

1 I. Khan  
 2 enantiomers?  
 3 A. Four.  
 4 Q. I'm sorry, pair.  
 5 A. Pair. Two pairs.  
 6 Q. Okay. You'll have four --  
 7 A. Enantiomers.  
 8 Q. Okay.  
 9 A. Yeah.  
 10 Q. And those enantiomers are called  
 11 what? Those two -- the -- the two pairs?  
 12 A. Diastereomers.  
 13 THE REPORTER: Repeat.  
 14 THE WITNESS: Di -- diastereomers.  
 15 Q. Now, what's the difference between --  
 16 well, strike -- what's the difference between a  
 17 diastereomer and an enantiomer?  
 18 A. Diastereomers are composed of  
 19 enantiomers.  
 20 THE REPORTER: Composed of?  
 21 THE WITNESS: Enantiomers.  
 22 THE REPORTER: Thank you.  
 23 Q. Chemically, is there a difference  
 24 between diastereomers and enantiomers?  
 25 A. Yeah.

1 I. Khan  
 2 two pair of enantiomers. So in order to do  
 3 enantiomeric separation, you need the chiral  
 4 column or some chiral derivatization.  
 5 THE REPORTER: Or some chiral?  
 6 THE WITNESS: Derivatization.  
 7 Q. Okay. Well, let me -- let me try and  
 8 ask it a -- a different way.  
 9 If you were to run a gas  
 10 chromatography, liquid chromatography on DMAA  
 11 that wasn't chiral --  
 12 A. Uh-huh.  
 13 Q. -- would it be possible to separate  
 14 the two pair of diastereomers from one another?  
 15 A. I'm not getting your question.  
 16 Q. Okay. We -- we will come back to it  
 17 later.  
 18 What's a racemic mixture?  
 19 A. Racemic mixture is having enantiomers  
 20 together.  
 21 Q. And when you say "having enantiomers  
 22 together," what do you mean?  
 23 A. I mean a mixture of two enantiomers.  
 24 Q. Any mixture of two enantiomers?  
 25 A. Actually -- actually, what I mean,

1 I. Khan  
 2 Q. And what's the difference?  
 3 A. The different diastereomers, as is  
 4 mentioned left and right, and so they are  
 5 together is called diastereomers. And you  
 6 separate them, they're enantiomers.  
 7 Q. So when you -- well, let me back up.  
 8 When you separate diastereomers, you have to  
 9 use a chiral column; correct? Or some -- some  
 10 method of chiral chemistry to separate the two  
 11 of them?  
 12 A. That's right.  
 13 Q. Right. Do you need to do that to  
 14 separate the pairs of enantiomers?  
 15 A. To -- if I'm the -- correct, you are  
 16 asking about separating enantiomers?  
 17 Q. So, for example, you have -- in DMAA,  
 18 you have two chiral --  
 19 A. Center.  
 20 Q. -- centers, you have four  
 21 diastereomers, and two pair of enantiomers;  
 22 correct?  
 23 A. No. 1,4 DMAA has a -- two  
 24 diastereomers, okay? And every diastereomers  
 25 is going to give you two enantiomers, so two --

1 I. Khan  
 2 racemate generally is a 50/50.  
 3 Q. It's what? It's a 50/50 mixture of  
 4 enantiomers?  
 5 A. Yeah.  
 6 Q. And when we're talking about natural  
 7 products --  
 8 A. Yes.  
 9 Q. -- do natural products have a racemic  
 10 mixture of enantiomers if they're chiral?  
 11 A. Not to my knowledge.  
 12 Q. They can never have a racemic  
 13 mixture?  
 14 A. Not biosynthetically, kind of  
 15 impossible or highly unlikely to have racemic  
 16 mixture in the ratio of 50/50.  
 17 Q. Do you know a Joseph Betz?  
 18 A. Yes.  
 19 Q. Who is he?  
 20 A. He's a -- I don't know exact title,  
 21 but he's in office of dietary supplement. He's  
 22 a director of -- I -- I don't know what, but I  
 23 know him well. He's in office of dietary  
 24 supplements. I can't give you his exact title.  
 25 Q. Okay. Do you know a John Cordelia

1 I. Khan  
2 (phonetic)?  
3 A. Cardellina.  
4 Q. Cardellina?  
5 A. Yeah.  
6 Q. And who is he?  
7 A. John Cardellina, you -- has worked  
8 with NCI for many, many years. He's well-known  
9 natural product chemist.  
10 Q. Okay.  
11 (Khan Exhibit No. 2 was marked for  
12 identification.)  
13 BY MS. WOOLSON:  
14 Q. Dr. Khan, I'm showing you what's been  
15 marked as Exhibit 2. Take a look at it and  
16 when you're ready to proceed, let me know.  
17 THE WITNESS: Should I read the  
18 whole thing?  
19 MR. DAVENPORT: You should review  
20 the entire document.  
21 Q. Ready to proceed? Okay. I'm showing  
22 you what's been marked Exhibit 2, which is a  
23 compilation of emails that were produced in  
24 this case. Specifically, I'm drawing your  
25 attention to the first page. The very last

1 I. Khan  
2 THE REPORTER: Lathemize  
3 (phonetic)?  
4 THE WITNESS: Racemize.  
5 Q. That's not what Mr. Cardellina said,  
6 though, did he? He said racemates are known  
7 from nature. Isn't that what he said?  
8 A. Natural products reported in  
9 racemates, when you go back and you look at the  
10 biosynthetic pathway, in most of the time or  
11 most all the time it finds out that it has been  
12 done in the process.  
13 Q. I understand that's your opinion.  
14 I'm asking you, am I correct, did I just read  
15 this email correctly that John Cardellina said  
16 "Racemates are known from nature (as natural  
17 products)"?  
18 MR. DAVENPORT: Objection.  
19 Q. Is that what he said?  
20 MR. DAVENPORT: Objection to the  
21 form of the question.  
22 Q. Is that what he said in the email?  
23 It's a yes or no question. Is that what he  
24 said in the email?  
25 MR. DAVENPORT: Objection. You can

1 I. Khan  
2 email at 8-9-12, 3:47 p.m., from John  
3 Cardellina, who says that "Racemates are known  
4 from nature as natural products. Something to  
5 remember in trying to dissect this."  
6 Correct?  
7 A. Yeah.  
8 Q. So Mr. Cardellina doesn't think that  
9 it's impossible to have a natural product  
10 that's a racemic mixture, does he?  
11 A. He has not given any evidence in that  
12 regard having racemic mixture. Racemic  
13 mixture, I can -- based on experience, I can  
14 say that racemic mixture, one, is a  
15 biosynthetic pathway, and the way the plant  
16 makes --  
17 THE REPORTER: Is a?  
18 THE WITNESS: Biosynthetic.  
19 Biosynthetic pathway.  
20 THE REPORTER: Uh-huh.  
21 THE WITNESS: That plants make a  
22 compound, and one is a chemical reaction  
23 can happen and compound can racemize.  
24 THE REPORTER: Compound can?  
25 THE WITNESS: Racemize.

1 I. Khan  
2 answer, Dr. Khan.  
3 A. Supported in racemate and it has been  
4 cited and reported that you can find the  
5 racemate but you have to qualify if the plant  
6 can make racemate or not. This email does not  
7 say that plants make racemate. It said can be  
8 found.  
9 Q. And what he said, racemates are known  
10 from nature; correct?  
11 MR. DAVENPORT: Same --  
12 A. As --  
13 MR. DAVENPORT: -- objection. You  
14 can answer.  
15 A. As natural products.  
16 Q. Correct. That's what he says.  
17 A. He's -- he didn't say "nature." He  
18 says "as natural products."  
19 Q. Fine.  
20 A. So there's a fine difference.  
21 Q. And what is that difference, in  
22 your -- your mind?  
23 A. In my mind, it is that he is not  
24 saying in this statement that nature makes  
25 racemate. Can be found as natural products, is

1 I. Khan  
2 a compound which can racemize by several  
3 factors.  
4 Q. So it is entirely possible that you  
5 can have a natural product that has a racemic  
6 mixture; correct?  
7 A. No.  
8 Q. And Mr. Cardellina's email on the  
9 bottom of page 2 is in response to comments by  
10 Dr. ElSohly, correct, who's saying that he  
11 finds the identical -- he finds it -- strike  
12 that.  
13 He says "Ikhlas is right about the  
14 isomers. It's very unusual to have an isomeric  
15 ratio of a synthetic material look identical to  
16 that of a natural product."  
17 Correct?  
18 A. Yes.  
19 Q. And then in response to that,  
20 Mr. Cardellina says "Racemates are known from  
21 nature as natural products." Correct?  
22 A. As -- he qualified it as "natural  
23 product." He didn't say "nature."  
24 Q. And I understand that's your  
25 argument. I was asking you what the email

1 I. Khan  
2 composition?  
3 Q. You tell me.  
4 A. In concentration, yes.  
5 Q. And what do you mean by  
6 "concentration"?  
7 A. Well, one enantiomer is -- for  
8 example, is 3 percent versus 5 percent. But  
9 composition, that one has one-to-one ratio,  
10 that's not possible.  
11 Q. Well, would you agree that it's  
12 possible to have a plant, one plant of the same  
13 species that has an enantiomeric mixture of,  
14 say, yeah, 60/40 and another that has the  
15 same -- that has the mixture at 70/30?  
16 A. I'm not sure about the percentage but  
17 yes, the ratio can be variable.  
18 (Khan Exhibit No. 3 was marked for  
19 identification.)  
20 BY MS. WOOLSON:  
21 Q. Let me know when you're ready to  
22 proceed, Dr. Khan.  
23 A. Yes.  
24 Q. Ready to proceed? Have you seen  
25 Exhibit 3 before?

1 I. Khan  
2 said.  
3 A. I mean, that's what is written in the  
4 bracket is "natural product."  
5 Q. Okay. So he's saying there can be  
6 natural products with a racemic mixture;  
7 correct?  
8 A. Not natural, but can be found as a  
9 natural product in the racemate.  
10 Q. Okay. We're moving on.  
11 Do you agree that the chemical  
12 composition of various geranium plants can  
13 vary? Strike that.  
14 Do you agree that the chemical  
15 composition of geranium plants can vary?  
16 A. To certain extent, yes.  
17 Q. And what factors will affect the  
18 chemical composition?  
19 A. Like any other plant, the season,  
20 growing conditions, age of the plant,  
21 environmental conditions, fertilizers,  
22 sunlight.  
23 Q. Do you also agree that the  
24 enantiomeric mixture of a plant can vary?  
25 A. You mean in concentration, or

1 I. Khan  
2 A. Yes.  
3 Q. And what is Exhibit 3?  
4 A. A publication done by our group.  
5 Q. And you're one of the author -- cited  
6 authors in the publication; correct?  
7 A. Yes.  
8 Q. And the article is discussing  
9 comparison of chemical and stereochemical tests  
10 for the identification and differ --  
11 differentiation of Pelargonium graveolens --  
12 A. Uh-huh.  
13 Q. -- correct?  
14 A. Yes.  
15 Q. And is that the fancy scientific name  
16 for geranium plants?  
17 A. It's the botanical name for the  
18 plant.  
19 Q. Okay. If you would turn to the  
20 second page of the article, first full  
21 paragraph, you see where it says "Many factors  
22 can influence the composition of essential  
23 oils, including those involving the plant  
24 (location, age, climate --"  
25 A. Uh-huh.



1 I. Khan  
 2 Q. "-- cultivars, temperature and growth  
 3 regulators)"?  
 4 Do you agree with that?  
 5 A. Yes.  
 6 Q. And do you agree also that other  
 7 factors that can affect the composition of the  
 8 plant include the sampling process?  
 9 A. Yes.  
 10 Q. Do you agree that another factor that  
 11 can affect the composition of plants is also  
 12 the -- the preparation and handling in the  
 13 study itself?  
 14 A. Can you explain to me what you mean  
 15 by that?  
 16 Q. Sure. For example, if the sample --  
 17 the plant is -- sample is treated a certain way  
 18 in the laboratory, certain chemicals are used  
 19 on it, certain solvents are used to extract it,  
 20 you can affect what -- ultimately, the  
 21 composition of the sample that is then  
 22 analyzed; correct?  
 23 A. Different solvent give it a different  
 24 components, yes.  
 25 Q. And similarly, if you are not careful

1 I. Khan  
 2 paragraph discusses differing enantiomer ratios  
 3 for that particular geranium oil?  
 4 A. What's the question?  
 5 MS. WOOLSON: Would you read the  
 6 question back?  
 7 (The reporter read from the record as  
 8 follows: "Would you agree that that  
 9 paragraph discusses differing enantiomer  
 10 ratios for that particular geranium oil?")  
 11 A. Yes.  
 12 BY MS. WOOLSON:  
 13 Q. At the last sentence of that  
 14 paragraph here, it states: "The presence of  
 15 the R isomer or a racemic mixture may indicate  
 16 adulteration."  
 17 Do you see that?  
 18 A. Yes.  
 19 Q. What's the basis for that statement?  
 20 A. Because again, it's equal ratio  
 21 racemization, not one or the other --  
 22 THE REPORTER: I -- I'm sorry.  
 23 It's an equal ratio?  
 24 THE WITNESS: Or racemization.  
 25 THE REPORTER: "Or"? Yes.

1 I. Khan  
 2 when you are distilling something or  
 3 evaporating something and you have a volatile  
 4 component, you could inadvertently drive off  
 5 the volatile component before you do the  
 6 analysis; correct?  
 7 A. In some instances. Not as a common  
 8 rule.  
 9 THE REPORTER: Not as a?  
 10 THE WITNESS: Common rule. Common.  
 11 A common rule.  
 12 MS. WOOLSON: A common rule?  
 13 THE WITNESS: Yeah.  
 14 THE REPORTER: Thank you.  
 15 Q. I also want to have you look at what  
 16 has been marked -- it's page 28184 at the  
 17 bottom.  
 18 A. Yeah.  
 19 Q. This is discussion of citronellol  
 20 enantiomers.  
 21 MS. WOOLSON: We'll get the  
 22 spelling to you later.  
 23 THE REPORTER: I'll -- I'll get  
 24 them from the documents. Thank you.  
 25 Q. Would you agree with me that that

1 I. Khan  
 2 THE WITNESS: That's what it's  
 3 talking about here.  
 4 Q. But what -- what is your basis for  
 5 saying it -- it indicates adulteration?  
 6 A. Because the ratio is equal.  
 7 Q. And how would you test to show that  
 8 that was adulteration versus the actual ratio  
 9 in the product?  
 10 A. That's what in figure 3 is the  
 11 [unintelligible] standards and --  
 12 THE REPORTER: I'm sorry. I don't  
 13 understand at all.  
 14 THE WITNESS: This is in figure 3.  
 15 THE REPORTER: This is in figure 3.  
 16 THE WITNESS: That the peaks can be  
 17 differentiated to see what the ratio is.  
 18 Q. Okay. That will tell you the ratio,  
 19 but that won't tell you how that ratio came to  
 20 be; correct?  
 21 A. Here. But again, racemization, 50/50  
 22 ratio is not present in the nature, so if you  
 23 find it, you have to question it.  
 24 Q. Okay. So it's your position that any  
 25 time there is a 50/50 mixture of enantiomers,

1 I. Khan  
 2 that is indicative of adulteration of a natural  
 3 product?  
 4 A. That's right.  
 5 Q. That's your -- that's your testimony?  
 6 A. No, that's the -- that's -- that's  
 7 what reading what was in Exhibit 2.  
 8 Q. Well, I -- I think you're talking  
 9 about Exhibit 3; right?  
 10 A. This is -- yeah. I mean, the email  
 11 is the same thing.  
 12 Q. What's crossover?  
 13 A. Crossover in plants is a hybrid --  
 14 hybridization that one species can be  
 15 hybridized as a crossover.  
 16 Q. What's crossover in chromatography?  
 17 A. Crossover in chromatography, when  
 18 the -- the one switches to another one.  
 19 Q. When one what switches to another  
 20 one?  
 21 A. One component, one enantiomer is  
 22 higher than the other.  
 23 Q. Have you ever heard of crossover  
 24 chromatography that causes retention time  
 25 reversal of compounds?

1 I. Khan  
 2 not -- I'm not aware of it. If you change the  
 3 conditions in columns, it can happen.  
 4 Q. So you're not aware that that's a  
 5 phenomenon that's common for essential oils?  
 6 A. Not for the same particular method.  
 7 Q. And I take it because you're not  
 8 aware of it, you've never tested to see whether  
 9 it occurred in any of the studies that you were  
 10 involved in.  
 11 A. No. It should not be happening.  
 12 Once you have a method developed, you would  
 13 know the profile. If it keep changing every  
 14 time you inject it, then it's not a method  
 15 anymore.  
 16 So if you change the conditions, you  
 17 change the columns and chromatographic  
 18 conditions, can we see the reversal, yes. But  
 19 by using the same method again and again and  
 20 one time you see this way and the next time you  
 21 see the reversal is scientifically not  
 22 possible.  
 23 Q. So if I were to tell you that I read  
 24 about crossover in the literature, you would  
 25 tell me that's scientifically not possible?

1 I. Khan  
 2 A. In what technique?  
 3 Q. In chromatography.  
 4 A. Chromatography, the reverse phase is  
 5 always reverse. That's when column reverse  
 6 phase retention time switches from normal phase  
 7 to reverse phase.  
 8 Q. Well, I'm not talking about what you  
 9 used, reverse phase column. I'm talking about  
 10 a standard column.  
 11 Have your ever heard of crossover  
 12 whereby the retention times will be reversed?  
 13 A. The same component?  
 14 Q. Yes.  
 15 A. Reverse with whom?  
 16 Q. So, for example, if you have a  
 17 compound such as an essential oil or plant  
 18 material that has a number of components --  
 19 A. Uh-huh.  
 20 Q. -- and you load the compound onto the  
 21 column and you get crossover so that the  
 22 components do not elute in the order in -- in  
 23 which you expect, they would elute in a reverse  
 24 order.  
 25 A. In the same conditions? I -- I'm

1 I. Khan  
 2 A. Unless I see the evidence that really  
 3 convincing me, but just -- just looking at the  
 4 purpose of the method where you are  
 5 [unintelligible] try and compound and you  
 6 are --  
 7 THE REPORTER: Where you are?  
 8 THE WITNESS: Identifying.  
 9 THE REPORTER: Yes.  
 10 THE WITNESS: Compound, and the  
 11 next time that compound has gone  
 12 somewhere else, if somebody has done it,  
 13 I would love to see that, but it just,  
 14 as a conventional method, doesn't look  
 15 like it.  
 16 Q. Okay. How many articles have you  
 17 authored or coauthored related to DMAA?  
 18 A. If you include DART, it's three.  
 19 Q. Okay. I'm going to go through those  
 20 in a -- in a little bit.  
 21 Let's turn back to Exhibit 1, which  
 22 is your report. And specifically, I'd like you  
 23 to look at paragraph 3 of your report.  
 24 You say: "I have concluded that  
 25 available scientific evidence does not support

1 I. Khan  
 2 Hi-Tech's assertion that DMAA occurs naturally  
 3 in geranium plants or oil."  
 4 Do you see that?  
 5 A. Yes.  
 6 Q. Okay. And when you say "available  
 7 scientific evidence," are you referring to the  
 8 studies that then follow in your report?  
 9 A. Both, because one so far has been  
 10 published in geranium plant and the rest of the  
 11 studies follow, yes.  
 12 Q. So, I'm -- I'm sorry. I may not have  
 13 understood your answer correctly.  
 14 A. Well --  
 15 Q. Is there something outside of the  
 16 reports that are listed in -- strike that.  
 17 Is there something outside of the  
 18 articles and scientific studies that are listed  
 19 in your report that you're relying on?  
 20 A. No. The published paper. Before  
 21 DMAA started analysis, there is lot -- many  
 22 publications we reported geranium analysis  
 23 which never reported it, plus the one that  
 24 really specifically talked about DMAA, so that  
 25 include both.

1 I. Khan  
 2 A. The first paper published by Mahmoud  
 3 ElSohly.  
 4 THE REPORTER: Published?  
 5 THE WITNESS: By Mahmoud ElSohly.  
 6 THE REPORTER: Thank you.  
 7 Q. And -- and earlier this morning when  
 8 we were talking about the various studies, this  
 9 would be the first study; is that correct?  
 10 A. By us.  
 11 Q. Okay. And it lists as authors  
 12 Dr. ElSohly; Dr. Gul, whom you've spoken about.  
 13 Kareem ElSohly, who is he?  
 14 A. He is working in PSLI.  
 15 Q. And what does he do there?  
 16 A. He contributes -- help Waseem Gul.  
 17 Q. Okay. Is he --  
 18 THE REPORTER: Contributes?  
 19 THE WITNESS: Work with Waseem Gul.  
 20 THE REPORTER: Thank you.  
 21 Q. So is he like a lab technician or  
 22 something like that?  
 23 A. Yeah.  
 24 Q. Okay. And then there's a name that  
 25 I'm not even going to attempt to pronounce, but

1 I. Khan  
 2 Q. Okay. And I -- and I take it when  
 3 you're saying there's one that specifically  
 4 talked about it, you're talking about the Ping  
 5 study.  
 6 A. Ping, Zhang, all the studies have  
 7 been done on DMAA.  
 8 Q. Okay. And all those studies are what  
 9 your report talks about?  
 10 A. That -- that's based on that one,  
 11 yes.  
 12 Q. Okay. Just want to make sure that  
 13 we -- we understand what -- what the basis for  
 14 your opinion is.  
 15 And so these studies that you're  
 16 relying on would include the studies that you  
 17 yourself participated in; correct?  
 18 A. Also.  
 19 (Khan Exhibit No. 4 was marked for  
 20 identification.)  
 21 BY MS. WOOLSON:  
 22 Q. Have you had a chance to look at  
 23 Exhibit 4?  
 24 A. Yes.  
 25 Q. What is Exhibit 4?

1 I. Khan  
 2 it's A-R-O-O-N-A.  
 3 A. Yeah, Aroona Weerasooriya. He --  
 4 he's a part -- he -- he was with us as a  
 5 botanist in medicine plant garden.  
 6 Q. Okay. And then there is Amar?  
 7 A. Amar. Amar Chittiboyina is a chemist  
 8 working in the center.  
 9 Q. Okay. And then we have --  
 10 A. Bharathi Avula. She is -- does all  
 11 the analysis. She's in the center.  
 12 Q. Okay. And then we have you?  
 13 A. Yes.  
 14 Q. And then we have Amy Eichner. And  
 15 who is she?  
 16 A. She's in USADA.  
 17 Q. So the U.S. Anti-Doping Association?  
 18 A. Yeah.  
 19 Q. Did she -- was she actually in the  
 20 lab doing work?  
 21 A. No.  
 22 Q. Okay. How about Larry Bower?  
 23 A. No. He's also in USADA.  
 24 Q. Was he in the lab doing any work?  
 25 A. No.

1 I. Khan

2 Q. Why are their names on the paper?

3 A. Because they contributed to -- to  
4 the -- to the hypothesis and the -- the --  
5 the -- scientifically. Like, I was not in the  
6 lab. I'm the office, so --

7 Q. But they don't work for the labs that  
8 did the work, "they" being Amy Eichner and  
9 Larry Bowers; correct?

10 A. Yes.

11 Q. And you were responsible for  
12 overseeing the work that was being done by the  
13 people that worked for you; correct?

14 A. Yeah.

15 Q. Okay. And is Amy Eichner a  
16 scientist?

17 A. I believe so.

18 Q. What about Larry Bower?

19 A. I think he's also scientist.

20 Q. But you don't know?

21 A. I -- I don't know their --

22 Q. Okay.

23 A. -- credentials.

24 Q. So when you say they contributed,  
25 other than money, what did they contribute?

1 I. Khan

2 MR. DAVENPORT: Objection to the  
3 form of the question. You can answer,  
4 Dr. Khan.

5 A. Yeah, I mean, as I said, I mean, we  
6 talk about the issue. That the first thing  
7 that Amy Eichner contacted us. There's an  
8 issue. Then we talk about is -- what it is  
9 they would like to -- what the question is.  
10 Would they ask that can we analyze whether  
11 DMAA's in the plant or not, and then they  
12 contributed into the text of the manuscript.

13 Q. So just so I'm clear, so the -- the  
14 U.S. Anti-Doping Association came to you and  
15 Dr. ElSohly and asked you for help?

16 A. Yes.

17 Q. Okay. And what specifically did they  
18 want you to do?

19 A. They -- since we are national center  
20 for natural product, they wanted us to look  
21 into the question whether DMAA's naturally  
22 occurring in geranium plant or not.

23 Q. Why did they want you to look into  
24 that?

25 A. Because they -- I think they took

1 I. Khan

2 legal action on it, and the question came that  
3 they are naturally occurring but there was no  
4 credible science at that time.

5 Q. This is after the Ping study;  
6 correct?

7 A. Ping study was done in 1996.

8 Q. So that -- that would be yes, after  
9 the Ping study?

10 A. Yes.

11 Q. So they came to you with this -- this  
12 question.

13 A. Yeah.

14 Q. And how did you go about finding a --  
15 a solution? What was your solution?

16 A. When we -- this question we pose all  
17 the time since we work on natural product and  
18 we do isolate and identify [unintelligible]  
19 novel component all the time and --

20 THE REPORTER: Identify?

21 THE WITNESS: And isolate and  
22 identify.

23 THE REPORTER: Did you say "a novel  
24 component"?

25 THE WITNESS: Yeah.

1 I. Khan

2 THE REPORTER: Thank you.

3 A. So that's -- the question is in order  
4 to do that, first you start with authentic  
5 sample where you have to -- the plant that  
6 you've chose is well identified. It's -- so  
7 you look into that plant is there or not. And  
8 then you develop a analytical method to analyze  
9 it. And once the method is developed, then you  
10 analyze unknown samples. So that's the  
11 procedure we go for everything.

12 Q. And how did you go about developing  
13 the analytical method here?

14 A. No, I think this one, we had only --  
15 we took the geranium plant first and also the  
16 standard to DMAA, which we did all the  
17 parameters required to evaluate the methods and  
18 then analyze the samples.

19 Q. Okay. So where did you get the  
20 standard for the DMAA?

21 A. DMAA standard was from Fisher  
22 Scientific.

23 Q. If I could direct you to the page  
24 that's numbered 27841. It's the third page.

25 A. Yes.

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1 I. Khan  
 2 Q. Under Materials and Methods, it says  
 3 "MHA standard."  
 4 A. Oh, that was bought from  
 5 Sigma-Aldrich. The solvent was from Fisher.  
 6 Q. Okay.  
 7 A. The standards were bought from  
 8 Sigma-Aldrich.  
 9 THE REPORTER: From Sigma?  
 10 THE WITNESS: Yeah.  
 11 MS. WOOLSON: Aldrich, A-L-D --  
 12 THE REPORTER: Aldrich? Thank you.  
 13 MS. WOOLSON: -- R-I-C-H.  
 14 THE REPORTER: Thank you.  
 15 Q. So you purchased this compound from  
 16 Sigma-Aldrich, and you were going to compare  
 17 that to the geranium plant; correct? The  
 18 substances in the geranium plant?  
 19 A. Yeah.  
 20 Q. How many substances are there in a  
 21 geranium plant?  
 22 A. Hundreds.  
 23 Q. Have they all been fully  
 24 characterized?  
 25 A. Maximum, there's a report up to 95 --

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1 I. Khan  
 2 MR. DAVENPORT: Ping, P-I-N-G.  
 3 THE REPORTER: Ping?  
 4 THE WITNESS: Ping/Li study --  
 5 THE REPORTER: Study? Yes.  
 6 A. It's not a minor component.  
 7 Q. So it's not a minor component?  
 8 A. Based on Ping/Li study, it's not a  
 9 minor component.  
 10 Q. Okay.  
 11 A. .6 percent in it.  
 12 Q. So what did you do to separate the  
 13 DMAA from the 90 or so other components of the  
 14 geranium plant --  
 15 MR. DAVENPORT: Objection to the --  
 16 Q. -- if anything?  
 17 MR. DAVENPORT: -- form of the  
 18 question. Assumes facts not in  
 19 evidence. You can answer.  
 20 A. This paper is asking one question, is  
 21 only one thing, the DMAA is there or not. So  
 22 the whole focus has been the presence or  
 23 absence of DMAA. So our target is already  
 24 fixed what we're looking for.  
 25 THE REPORTER: So?

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1 I. Khan  
 2 if I remember correctly, 90-some has been  
 3 identified.  
 4 Q. And what are the major components of  
 5 a geranium plant?  
 6 A. Citronellol, geraniol, and many  
 7 others has been reported. So I can't give you  
 8 the exact, but citronellol and geraniol are the  
 9 main ones.  
 10 Q. And approximately what percentage of  
 11 the composition of the geranium plant do the  
 12 citronellol and geraniol make up?  
 13 A. A big portion. I cannot give you a  
 14 percentage without looking into the documents,  
 15 but --  
 16 Q. So would it be fair to say that if --  
 17 and I'm not saying it does -- I'm saying if  
 18 DMAA were to be in a geranium plant, it would  
 19 be a small percentage of the composition,  
 20 overall composition of the geranium plant?  
 21 A. Based on the first study, Ping/Li --  
 22 THE REPORTER: Based on the?  
 23 THE WITNESS: Ping.  
 24 THE REPORTER: Based on the?  
 25 THE WITNESS: Ping.

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1 I. Khan  
 2 THE WITNESS: Our target --  
 3 THE REPORTER: "Our target"?  
 4 THE WITNESS: -- is already fixed.  
 5 THE REPORTER: Thank you.  
 6 Q. So is it your testimony that you  
 7 didn't attempt to separate the DMAA from the  
 8 other components of the geranium plant --  
 9 MR. DAVENPORT: Object to the  
 10 form --  
 11 Q. -- as part of --  
 12 MR. DAVENPORT: -- of the question.  
 13 Q. -- this study?  
 14 THE REPORTER: I didn't hear the  
 15 end of your question.  
 16 MS. WOOLSON: As part of this  
 17 study.  
 18 THE REPORTER: Thank you.  
 19 A. Not sure what you mean by  
 20 "separation."  
 21 Q. I -- I'll -- I'll rephrase the  
 22 question.  
 23 You told me that the geranium plant  
 24 has at least 90 different --  
 25 A. Yes.

1 I. Khan  
 2 Q. -- components.  
 3 A. Yes.  
 4 Q. What did you do with the geranium  
 5 plant in order to analyze it for the presence  
 6 of DMAA?  
 7 A. Yeah, so we have a standard. We  
 8 develop a method. We know what to look for.  
 9 That's what we did in geranium plant sample.  
 10 Q. So you --  
 11 A. Now, the thing is separation is  
 12 totally different thing than focusing on one  
 13 component there or not.  
 14 Q. Okay. So I just want to be sure I  
 15 understand what you did in this 2012 study.  
 16 A. Yeah.  
 17 Q. What did you do to the geranium plant  
 18 in order to determine whether or not DMAA was  
 19 present or not present?  
 20 A. Yeah, so we compared -- we develop a  
 21 GC method, an LC method --  
 22 THE REPORTER: "We develop?"  
 23 THE WITNESS: GC.  
 24 THE REPORTER: A GC matter?  
 25 THE WITNESS: Method.

1 I. Khan  
 2 Q. Right.  
 3 A. Yes, yes.  
 4 Q. So you would run it through the  
 5 columns and you would see where you got a  
 6 peak --  
 7 A. Yes.  
 8 Q. -- for the standard; right?  
 9 A. Right.  
 10 Q. Okay. And then what did you do with  
 11 the plant?  
 12 A. Plant sample was processed, which  
 13 goes through extraction, spiking, recovery, and  
 14 then inject, same method where we have  
 15 determined the DMAA analysis.  
 16 Q. Okay. And when you say you extracted  
 17 the plant, what do you mean?  
 18 A. The plant material has to be  
 19 extracted with a solvent to -- in order to get  
 20 the component, because in any chromatographic  
 21 condition, it has to be injected in the liquid  
 22 form.  
 23 Q. Okay. So you took the plant matter  
 24 and you essentially dissolved it in a solvent?  
 25 A. We don't call it dissolve because

1 I. Khan  
 2 MR. DAVENPORT: GC. Capital G,  
 3 capital C.  
 4 THE WITNESS: Method.  
 5 THE REPORTER: A GC method? Is  
 6 that what you're saying?  
 7 THE WITNESS: Yeah.  
 8 THE REPORTER: Thank you.  
 9 A. And LC method to find a -- the  
 10 particular component, which happened to be  
 11 DMAA.  
 12 Q. Okay. And correct me if what I'm  
 13 about to say is wrong but I just want to  
 14 summarize this to make sure we're all on the  
 15 same page.  
 16 And that method that you developed  
 17 involved taking the standard that you had  
 18 purchased and running it through the GC, or gas  
 19 chromatograph, and LC, the liquid  
 20 chromatograph, and finding peaks for it;  
 21 correct? Or signal for it?  
 22 A. Looking for it.  
 23 Q. But we're talking about the sample,  
 24 the standard.  
 25 A. Yeah, the standards.

1 I. Khan  
 2 it -- really, plant material don't dissolve,  
 3 but you extract them.  
 4 Q. Okay. So you chopped up the plant  
 5 material, put it in a beaker, put some solvent  
 6 on top of it, stirred it around?  
 7 A. Yeah.  
 8 Q. Filtered it?  
 9 A. Filtered it.  
 10 Q. You took the filtrate, and that's  
 11 what you injected onto the columns?  
 12 A. Yeah, that's right.  
 13 Q. Okay. And as part of the study at  
 14 any point did you see what else -- did you  
 15 check to see if there were any other components  
 16 in the filtrate besides the DMAA, if it were  
 17 there?  
 18 A. No.  
 19 Q. Okay. So you took the filtrate, you  
 20 inject it onto the gas chromatogram and in --  
 21 through the liquid chromatogram, and then what  
 22 did you do?  
 23 A. Analyze it and write the report.  
 24 Q. And when you say you analyzed it,  
 25 what do you mean?

1 I. Khan

2 A. The -- the method which is already  
3 established with their standards, so you have  
4 one sample, which is a standard, and then you  
5 have your extracted samples that you go through  
6 the same process and then you see the response.

7 Q. And so you would compare the peaks  
8 that you got from the plant material with the  
9 peaks you got from the standard?

10 A. That's right.

11 Q. Okay. And did you also spike the  
12 plant material?

13 A. Yes. As -- as part of the process of  
14 method development, you have to spike, you have  
15 to do the recovery, you have to do the  
16 position.

17 Q. Uh-huh, okay. How -- when you did  
18 the extraction of the plant material, what  
19 steps, if any, did you take to determine if the  
20 extraction was successful for DMAA?

21 A. That's called recovery.

22 Q. Okay. And what did you do to test  
23 your recovery?

24 A. For recovery, you spike the samples  
25 and see how much you're getting back, and based

1 I. Khan

2 on that one, you see what the recovery is.

3 Q. You used, I'm sorry, five samples?  
4 Is that what you said?

5 A. Spiked.

6 Q. Spiked samples?

7 A. Yes.

8 Q. Spiked samples.

9 So you would take plant material, you  
10 would spike it with DMAA, you would do the  
11 extraction, you would measure your recovery; is  
12 that --

13 A. Yeah.

14 Q. -- fair? Okay.

15 What was the recovery?

16 A. Recovery, I believe it was  
17 35 percent, or something like that.

18 Q. So less than 50 percent?

19 A. Less than 50 percent.

20 Q. Okay.

21 A. But that recovery was higher than  
22 19 percent reported by Fleming.

23 Q. Fleming used a different procedure  
24 than you used in this paper; correct?

25 A. Yeah.

1 I. Khan

2 Q. Okay. What was the level of  
3 detection in the study?

4 A. GC method was .1 ppm.

5 THE REPORTER: Point one?

6 THE WITNESS: Ppm, and -- yeah.

7 THE REPORTER: Thank you.

8 Q. You said GC. What about the LC?

9 A. LC was -- I believe it was 10 pp --  
10 let me see. What was that? LC was 2.5 ppb.

11 THE REPORTER: Pp?

12 THE WITNESS: B.

13 THE REPORTER: Thank you.

14 Q. And just so I'm clear, you didn't run  
15 any analysis to determine what other components  
16 may have been in the extract; correct?

17 A. That's right.

18 Q. So what was the result of this study?

19 A. We did not find MHA in all the  
20 samples except products.

21 Q. When you say you didn't find MHA --  
22 and let me just back up.

23 MHA is DMAA; right?

24 A. Yeah.

25 Q. Okay. In any of the samples except

1 I. Khan

2 products, you mean actual supplements or  
3 manufactured products?

4 A. Yeah, these are the three products  
5 listed here.

6 Q. Okay. And you're looking at table 2;  
7 correct?

8 A. That's right.

9 Q. Okay. How many different plant  
10 samples did you analyze as part of this test?

11 A. Okay, so we had sample from  
12 Mississippi that was a dry samples, mature  
13 leaves, fresh leaves. Then we had authentic  
14 samples from India. And then we had commercial  
15 oils which say they have --

16 THE REPORTER: We had commercial?

17 THE WITNESS: Oils.

18 THE REPORTER: Oils? Yes.

19 A. Which says it contains Pelargonium  
20 graveolens. So I think it was all 20 samples.

21 Q. Okay. Let me -- let me rephrase the  
22 question.

23 How many actual different plant --  
24 plant material samples did you have?

25 A. I will say three or more. And if you

1 I. Khan  
 2 count this dried and this, so I will say at  
 3 least three authentic samples.  
 4 Q. Okay. Because when -- when I look at  
 5 the Materials and Methods section of this  
 6 article, page 3, it says you obtained leaves  
 7 and oil from the Indian Institute of Integrated  
 8 Medicine, and leaves and stems from medicinal  
 9 plants --  
 10 A. Yeah, in --  
 11 Q. -- in National Center for Natural  
 12 Products Research --  
 13 A. Yeah.  
 14 Q. -- in Mississippi.  
 15 A. Yeah.  
 16 Q. So I only see basically two sources  
 17 for the plants.  
 18 A. Yeah, and one oil.  
 19 Q. Okay. And none of those plants came  
 20 from China; correct?  
 21 A. In this study, yes.  
 22 MR. DAVENPORT: Counsel, while  
 23 you're looking at that, I'm going to  
 24 propose that we go to noon. Is that  
 25 okay with you?

1 I. Khan  
 2 A. Yes.  
 3 Q. And that was after you had done the  
 4 analysis that we had discussed in Exhibit 4;  
 5 correct?  
 6 A. Looks like analysis is -- was not  
 7 completed.  
 8 Q. It's not completed? Okay.  
 9 Now, if you go to the third page of  
 10 the email, at the top of the page there's an  
 11 email from Dr. ElSohly to Amy Eichner; correct?  
 12 A. Yes.  
 13 Q. And you're copied on that email;  
 14 correct?  
 15 A. Uh-huh.  
 16 Q. And it says: "We analyzed the  
 17 samples you just sent to me by the LC/MS/MS  
 18 method and they do contain low levels of DMP  
 19 (in the nanogram per milliliter range)."  
 20 Correct?  
 21 A. Yeah.  
 22 Q. What samples are those?  
 23 A. This was in the products.  
 24 Q. So these were products?  
 25 A. Yes.

1 I. Khan  
 2 MS. WOOLSON: Yeah.  
 3 MR. DAVENPORT: Okay.  
 4 MS. WOOLSON: That's fine.  
 5 MR. DAVENPORT: And then we'll take  
 6 a lunch break and --  
 7 MS. WOOLSON: Resume.  
 8 MR. DAVENPORT: -- resume. Very  
 9 good. Okay.  
 10 (Khan Exhibit No. 5 was marked for  
 11 identification.)  
 12 BY MS. WOOLSON:  
 13 Q. Have you seen Exhibit 5 before?  
 14 A. Yes.  
 15 Q. Okay. And what is Exhibit 5?  
 16 A. Talking about sample analysis.  
 17 Q. Okay. And when you say talking about  
 18 sample analysis, this -- this, Exhibit 5, is a  
 19 compilation of emails between Dr. ElSohly,  
 20 yourself, Larry Bowers, and Amy Eichner;  
 21 correct?  
 22 A. Yes.  
 23 Q. And the date of the -- the email  
 24 exchange appears to be late May, early June  
 25 2011; correct?

1 I. Khan  
 2 Q. Okay. And these were the products  
 3 that you analyzed in Exhibit 4?  
 4 A. Yeah.  
 5 Q. And which products?  
 6 A. I can't recall that.  
 7 Q. And when you say -- strike that.  
 8 If you look at table 2 on Exhibit 4,  
 9 there are three products listed. Table 2, the  
 10 last page of the report.  
 11 A. Yeah.  
 12 MR. DAVENPORT: I apologize, I've  
 13 got a -- I'm missing --  
 14 THE WITNESS: No, the last page.  
 15 MR. DAVENPORT: You're talking  
 16 about figure 14?  
 17 THE WITNESS: Oh, you're missing  
 18 one page?  
 19 MR. DAVENPORT: Yeah, I'm actually  
 20 missing -- regarding Exhibit 4, as I see  
 21 it -- you kept referring to -- I've got  
 22 2, 4, page numbers 2, 4, 6, 8, so I  
 23 don't have the full copy.  
 24 MS. WOOLSON: Hang on. I might  
 25 have an extra copy.



1 I. Khan  
 2 MR. DAVENPORT: That's all right.  
 3 Hold on. Pause for a minute.  
 4 (Discussion held off the record.)  
 5 BY MS. WOOLSON:  
 6 Q. Back to table 2 of Exhibit 4, there  
 7 were three products listed there; correct?  
 8 A. Yes.  
 9 Q. And they are all listed as having  
 10 concentrations in the milligram per gram --  
 11 A. Yes.  
 12 Q. -- range; correct?  
 13 A. Yeah.  
 14 Q. Not microliter -- nanogram per  
 15 milliliter; correct?  
 16 A. Yeah.  
 17 Q. Okay. And you still think those are  
 18 the products that you're talking about in this  
 19 particular paragraph?  
 20 A. Likely.  
 21 Q. Likely? Are you sure?  
 22 A. I'm -- I'm -- again, I -- I can't  
 23 recall unless I look at -- back.  
 24 Q. Okay. And what would you look at to  
 25 determine which products were tested on or

1 I. Khan  
 2 about May 27, 2011, and had low levels of DMP  
 3 in them?  
 4 A. These are the products that should be  
 5 cataloged in ElSohly's, so he should have all  
 6 this information.  
 7 Q. And he should have it in what?  
 8 A. They do a chain of custody when they  
 9 receive it. They should have it.  
 10 Q. And so let me ask you, when you look  
 11 at table 2 and you go up to the -- the fresh  
 12 plant material, rather, the plant material --  
 13 A. Uh-huh.  
 14 Q. -- the first four --  
 15 A. Uh-huh.  
 16 Q. -- samples say that there's  
 17 concentration of less than 10 nanograms per  
 18 milliliter; correct?  
 19 A. That's the -- for the detection  
 20 limit.  
 21 Q. But it doesn't say not detected. It  
 22 says less than 10 micro -- nanograms per  
 23 milliliter; correct?  
 24 A. This -- this is a scientific  
 25 practice. Always, you -- whatever the value

1 I. Khan  
 2 you are measuring, you -- below that, you just  
 3 don't say it. You put your limit.  
 4 Q. Okay. And then below it, though, for  
 5 all the rest of the products, you have  
 6 "nondetect"; correct?  
 7 A. Yeah.  
 8 Q. Okay. So you didn't say nondetect  
 9 for the top four?  
 10 A. Yeah.  
 11 Q. Correct.  
 12 And in this email that we're talking  
 13 about, we're talking about products that were  
 14 sampled at the LC/MS/MS method and have low  
 15 levels of DMP, in the nanograms per milliliter  
 16 range; correct?  
 17 A. This is the product?  
 18 Q. I'm talking about the email.  
 19 A. Okay, I'm talking about the email.  
 20 This is not about the geranium plant material.  
 21 Q. Just let me finish my question, sir.  
 22 The email talks about samples that  
 23 were analyzed by the LC/MS/MS method that do  
 24 contain low levels of DMP in the nanogram per  
 25 milliliter range; correct?

1 I. Khan  
 2 A. Yeah.  
 3 Q. That's what the email says.  
 4 And what's reported in table 2 are  
 5 four plant samples that have a limit of less  
 6 than 10 nanograms per milliliter; correct?  
 7 A. Can -- can I answer? These  
 8 products --  
 9 Q. It's a yes or no question.  
 10 MR. DAVENPORT: Objection to the  
 11 form. He -- he's allowed to answer the  
 12 question.  
 13 MS. WOOLSON: But he's not.  
 14 MR. DAVENPORT: Okay.  
 15 MS. WOOLSON: That's the problem.  
 16 It's a yes or no question.  
 17 MR. DAVENPORT: It's -- it -- it --  
 18 your yes or no question -- the question  
 19 may not, you know, determine a yes or no  
 20 answer.  
 21 A. These samples, if you are referring  
 22 to these samples, they are not the same.  
 23 Q. But you already told me you don't  
 24 know, didn't you?  
 25 A. Yeah, but these are the product.

1 I. Khan  
 2 They never send us any authentic samples of any  
 3 geranium plant. That for sure I know.  
 4 Q. Okay. You would agree with me  
 5 nevertheless that table 2 reports a  
 6 concentration for the four plants as nanograms  
 7 per milliliter; correct?  
 8 So less than 10 nanograms per  
 9 milliliter; correct?  
 10 A. That was our detection --  
 11 Q. Right.  
 12 A. -- limit.  
 13 Q. And the other plants, they say  
 14 nondetect; correct?  
 15 A. Yeah.  
 16 Q. Okay. And for the samples, the  
 17 products that you say are the subject of this  
 18 email, those concentrations are reported in  
 19 milligrams per gram?  
 20 A. Yeah.  
 21 Q. Not nanograms per milliliter --  
 22 A. Yeah.  
 23 Q. -- correct? Okay.  
 24 And if you found low levels of  
 25 product in -- low levels of -- of DMAA in the

1 I. Khan  
 2 Q. So she's talking about what to do if  
 3 DMAA is actually found in the plant material;  
 4 correct?  
 5 A. Yes.  
 6 Q. Okay. And then Dr. ElSohly's  
 7 response to her is that: "In the next couple  
 8 of days, we will conclude all our testing and  
 9 we will have a very clear picture. Anyway, it  
 10 appears that the levels are really low, in the  
 11 parts per billion range."  
 12 Correct?  
 13 A. That's what the email says.  
 14 Q. And then if you go to the very top of  
 15 the -- the -- the email, it's the first email  
 16 on the first page, Dr. ElSohly is now talking  
 17 about: "If the samples show 2 to 8 ppb, we can  
 18 comfortably say absent with a detection limit  
 19 of 10 ppb, or something like that."  
 20 Correct?  
 21 A. Yeah.  
 22 Q. And micro -- micrograms -- excuse  
 23 me -- nanograms per milliliter, is that ppb?  
 24 Parts per billion?  
 25 A. Yes.

1 I. Khan  
 2 products, you said you went -- then went back  
 3 and analyzed all of the samples using this new  
 4 LC mass spec/mass spec method; correct?  
 5 A. Yeah.  
 6 Q. And this LC mass spec/mass spec  
 7 method was a new method that you guys -- excuse  
 8 me -- your lab had -- had developed; correct?  
 9 A. That particular method, yes.  
 10 Q. Okay.  
 11 A. LC method has been reported earlier.  
 12 Q. If you go to the email immediately  
 13 preceding the email that we were just looking  
 14 at in Exhibit 5, this is from Ms. Eichner to  
 15 Dr. ElSohly. It's on page 4273.  
 16 A. Yes.  
 17 Q. You see where she says: "If it is in  
 18 there at a measurable level, then our message  
 19 will obviously change slightly. We will focus  
 20 more heavily on synthetic DMP not being a  
 21 dietary ingredient, but DMP extracted from a  
 22 plant meets the definition of a dietary  
 23 ingredient."  
 24 Correct?  
 25 A. That's what it reads, yes.

1 I. Khan  
 2 Q. So what Dr. ElSohly is talking about  
 3 is reporting a detection limit of 10 ppb, which  
 4 would prevent -- excuse me, which would allow  
 5 him not to record detections below that;  
 6 correct?  
 7 A. No, because there was a follow-up  
 8 identification of [unintelligible] that --  
 9 THE REPORTER: I'm sorry. There  
 10 was a follow-up?  
 11 THE WITNESS: Follow-up method  
 12 developed and checked with Q-TOF,  
 13 Q-T-O-F --  
 14 THE REPORTER: "There was a  
 15 follow-up method"?  
 16 THE WITNESS: Yes.  
 17 THE REPORTER: "Developed and"?  
 18 THE WITNESS: To confirm.  
 19 THE REPORTER: "To confirm."  
 20 THE WITNESS: The identity.  
 21 THE REPORTER: Thank you.  
 22 A. If his intention was to hide the  
 23 results, he would not have used the Q-TOF  
 24 method to confirm it, so --  
 25 THE REPORTER: He would not have

1 I. Khan  
2 used the?  
3 THE WITNESS: The Q-TOF method  
4 to --  
5 MR. DAVENPORT: It's -- it's  
6 Q-T-O-F?  
7 THE WITNESS: Yes.  
8 MS. WOOLSON: Q-T-O-F?  
9 THE REPORTER: Okay. "The Q-TOF  
10 method to confirm it." Yes, thank you.  
11 Q. And -- and when you say "Q-TOF,"  
12 you're talking about the LC mass spec/mass spec  
13 method?  
14 A. That's --  
15 Q. Okay.  
16 A. -- correct. So the thing is this  
17 is -- it can be implied that Amy is asking him  
18 to hide it and he said we will hide it, but  
19 then why we are going to do the confirmation?  
20 Q. But he's actually talking about the  
21 results of the Q-TOF method that you just  
22 talked about; right?  
23 That's what he's talking about in  
24 that paragraph?  
25 A. No, he is talking about the

1 I. Khan  
2 A. Yeah, in the -- in the geranium  
3 sample.  
4 Q. In the geranium sample.  
5 Without any effort to isolate DMAA if  
6 it was in that sample; correct?  
7 A. I -- I do not -- how do -- how do you  
8 isolate when you're identifying? So I'm little  
9 confused with this question.  
10 Q. Well, I'll -- I'll state it again.  
11 What you were running the -- the -- the NMR on;  
12 right --  
13 A. Yeah.  
14 Q. -- was the extract from the plant  
15 material --  
16 A. That's right.  
17 Q. -- correct?  
18 A. Yes.  
19 Q. With all the components, the 90-plus  
20 components in there?  
21 A. Yes.  
22 Q. Okay, thank you. And -- and you  
23 would agree with -- strike that.  
24 Can you point to me the NMR for the  
25 standard DMA solution?

1 I. Khan  
2 LC/LC/MS -- LC/MS/MS level.  
3 Q. And isn't that the new method?  
4 A. Then this is -- then it use the Q-TOF  
5 method, which in the paper, which it says we  
6 also give the high resolution mass spec to  
7 confirm --  
8 THE REPORTER: "We also give"?  
9 THE WITNESS: High resolution.  
10 MS. WOOLSON: High resolution.  
11 THE REPORTER: Oh, high resolution.  
12 High resolution. "We also give the high  
13 resolution"?  
14 THE WITNESS: Mass spec --  
15 THE REPORTER: Yes.  
16 THE WITNESS: -- to confirm --  
17 THE REPORTER: "To confirm"? Thank  
18 you.  
19 THE WITNESS: -- the identity of  
20 the component.  
21 Q. And when you say you gave the high  
22 resolution mass spec to confirm the component,  
23 you're talking about the high resolution mass  
24 spec of the full extracted material from the  
25 plant; correct?

1 I. Khan  
2 A. It's not there.  
3 Q. Okay, thank you.  
4 Now if you go back to Exhibit 5,  
5 which is the email, the second email on the  
6 first page from Dr. Bowers, he's expressing  
7 some concern about relying on the LC mass  
8 spec/mass spec method to verify presence of a  
9 substance.  
10 Do you see that?  
11 A. Yeah.  
12 Q. But he seems to think that it's okay  
13 to rely on it to -- to show the absence of a  
14 substance; correct?  
15 A. Wrong interpretation.  
16 Q. Pardon me?  
17 A. He doesn't say that.  
18 Q. Does he say at the bottom of the  
19 sentence --  
20 A. He is talking about the limitations  
21 of the method.  
22 Q. The limitations of what? The method?  
23 A. Method.  
24 Q. Okay. But he says: "The absence of  
25 characteristic ions at the expected retention

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<p>1 I. Khan</p> <p>2 time, however, is helpful in establishing the</p> <p>3 absence of a compound"; correct?</p> <p>4 A. Yes. He is talking about the --</p> <p>5 using more ions for the confirmation.</p> <p>6 Q. Well, he's talking about using the</p> <p>7 absence of ions to establish the absence of a</p> <p>8 compound, not more ions to confirm the presence</p> <p>9 of a compound, in that sentence.</p> <p>10 A. In that, that -- that's the</p> <p>11 interpretation.</p> <p>12 Q. Okay. Did Dr. Bowers and Dr. Eichner</p> <p>13 see this report, Exhibit 4, before it was</p> <p>14 published?</p> <p>15 A. Yeah.</p> <p>16 Q. And did they make revisions to it?</p> <p>17 A. No.</p> <p>18 Q. No revisions at all?</p> <p>19 A. As far as I know. Dr. ElSohly can</p> <p>20 provide you more information.</p> <p>21 (Khan Exhibit No. 6 was marked for</p> <p>22 identification.)</p> <p>23 BY MS. WOOLSON:</p> <p>24 Q. Have you seen Exhibit 6 before?</p> <p>25 A. No, I did not.</p>	<p>1 I. Khan</p> <p>2 Q. Okay. Understanding you haven't seen</p> <p>3 it before, would you agree with me that this is</p> <p>4 an email from Dr. Bowers to Dr. Gul and</p> <p>5 Dr. ElSohly and Dr. Eichner discussing</p> <p>6 paragraphs that he wants to be added to the</p> <p>7 article that we've been talking about as</p> <p>8 Exhibit 4?</p> <p>9 MR. DAVENPORT: I'm going to object</p> <p>10 to the form of the question, but you may</p> <p>11 answer, Dr. Khan.</p> <p>12 A. As I mentioned earlier, that they</p> <p>13 have provided editing and provided their</p> <p>14 comments being part of the manuscript, and</p> <p>15 that's very usual, to have a discussion.</p> <p>16 Q. And is it usual to have a discussion</p> <p>17 where two people who were involved in the</p> <p>18 funding of the study are suggesting conclusions</p> <p>19 for the study?</p> <p>20 A. Funding is -- having a scientific</p> <p>21 discussions, like in previous exhibit they talk</p> <p>22 about the limitation of LC/MS/MS, that's --</p> <p>23 that's very usual among authors to discuss a</p> <p>24 manuscript, provide the correct information.</p> <p>25 Q. And -- and again, by "authors,"</p>
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<p>1 I. Khan</p> <p>2 Dr. Bowers and Dr. Eichner didn't perform any</p> <p>3 of the studies involved; correct?</p> <p>4 A. So I did not do either.</p> <p>5 Q. And they didn't supervise anybody who</p> <p>6 performed any of the studies; correct?</p> <p>7 A. That's right.</p> <p>8 Q. Okay.</p> <p>9 MS. WOOLSON: It's about 12. Do</p> <p>10 you want to break?</p> <p>11 MR. DAVENPORT: That'll work.</p> <p>12 (Recess taken.)</p> <p>13 BY MS. WOOLSON:</p> <p>14 Q. Dr. Khan, what is ChromaDex?</p> <p>15 A. ChromaDex is a company selling</p> <p>16 standards and involved in contractual services</p> <p>17 related to natural products, reference</p> <p>18 standards, analysis --</p> <p>19 THE REPORTER: I'm sorry?</p> <p>20 THE WITNESS: Analysis.</p> <p>21 THE REPORTER: What analysis?</p> <p>22 THE WITNESS: General analysis.</p> <p>23 THE REPORTER: General? Okay.</p> <p>24 Just -- I just didn't hear the word.</p> <p>25 Okay. "General analysis."</p>	<p>1 I. Khan</p> <p>2 THE WITNESS: Yeah. Of nature</p> <p>3 products.</p> <p>4 Q. And what is your relationship to</p> <p>5 ChromaDex?</p> <p>6 A. ChromaDex initially started as in</p> <p>7 collaboration with University of Mississippi, I</p> <p>8 believe in 1998, around that time.</p> <p>9 Q. And how were you involved with</p> <p>10 ChromaDex?</p> <p>11 A. Initially they funded research to</p> <p>12 isolate the standard compounds to University of</p> <p>13 Mississippi and I was the PI of that project.</p> <p>14 Q. And by "PI" you mean principal</p> <p>15 investigator?</p> <p>16 A. That's right.</p> <p>17 Q. Okay. And following your role as</p> <p>18 principal investigator, have you continued to</p> <p>19 have a relationship with ChromaDex?</p> <p>20 A. No, no financial project after that</p> <p>21 that I did.</p> <p>22 Q. Do you own any shares of stock of</p> <p>23 ChromaDex?</p> <p>24 A. Yes, I do.</p> <p>25 Q. And how many shares of stock do you</p>

1 I. Khan  
2 own?  
3 A. They recently changed to another  
4 exchange so I don't know exactly, but it should  
5 be around one-third of what I had, which was  
6 238,000, I believe.  
7 Q. And do you know if you are one of the  
8 principal shareholders of ChromaDex?  
9 A. No, I'm not.  
10 Q. You're not?  
11 Do you know who the principal  
12 shareholders of ChromaDex are?  
13 A. I certainly know that Frank is, but  
14 I -- I'm not sure who else is there right now.  
15 I don't follow.  
16 Q. And what's Frank's last name?  
17 A. Jaksch, J-A-K-S-C-H.  
18 Q. Okay. And when did you become a  
19 ChromaDex shareholder?  
20 A. Once they issued the shares, I  
21 remember it was.  
22 Q. Okay. And do you sit on the board of  
23 ChromaDex?  
24 A. No.  
25 Q. Okay. Have you ever sat on the board

1 I. Khan  
2 the source of MHA and the F -- HFB derivative  
3 of the IS showing a small amount of MHA."  
4 Do you see that?  
5 A. Yes.  
6 Q. And then two pages over, on figure 9,  
7 you have -- the legend at the bottom of the --  
8 the graphic says: "GC mass spec selected  
9 chromatograms for the HFB derivative of the IS  
10 showing a small amount of impurity of MHA."  
11 Do you see that?  
12 A. Yeah.  
13 Q. Okay. And where -- can you point to  
14 me on the chromatogram where the MHA shows up?  
15 A. These are the ions for the MHA.  
16 Q. And when you say "these are," what  
17 are -- what are you pointing to?  
18 A. This left side.  
19 Q. The left side? Okay.  
20 And how did -- did you ever determine  
21 how the IS -- excuse me, how this -- this  
22 particular compound came to be contaminated  
23 with MHA?  
24 A. Yes. There is a -- a small  
25 overlapping [unintelligible] --

1 I. Khan  
2 of ChromaDex?  
3 A. No.  
4 Q. Do you know how many shareholders  
5 ChromaDex has?  
6 A. I don't follow it. I really don't  
7 know. But they are changing so quickly so fast  
8 so I'm not sure.  
9 Q. When you say they are changing so  
10 quickly so fast, what do you mean?  
11 A. I mean the business is growing very  
12 fast, they are acquiring, they are having other  
13 companies, so I can't anticipate the -- the  
14 whole complex deal.  
15 Q. And I take it you are not employed or  
16 do not have a contract with ChromaDex. Is that  
17 correct?  
18 A. That's right.  
19 Q. Okay, okay. I'd like to have you  
20 turn back to Exhibit 4 again. I have a couple  
21 more questions for you. So on page 27847, the  
22 text at the bottom of the page, there's a  
23 discussion of -- where is it? -- it says  
24 "extract of .1 milligrams of a powdered  
25 commercial product alleging P. graveolens as

1 I. Khan  
2 THE REPORTER: A small?  
3 THE WITNESS: Overlapping.  
4 Q. Overlapping?  
5 A. Yes. They found impurity there which  
6 later on was confirmed not to be MHA.  
7 Q. But as far as this paper goes,  
8 that -- that information's not in this paper;  
9 correct?  
10 A. That's what is written, yes.  
11 Q. Well, what's written is that the  
12 impurity was MHA; right?  
13 A. A small amount of impurity, but yeah.  
14 Q. All right. And if it wasn't MHA,  
15 what was the impurity determined to be?  
16 A. Something else, not MHA.  
17 Q. And did you publish any papers about  
18 determining the identity of that impurity?  
19 A. No.  
20 Q. And who did the work to determine  
21 that the impurity was not MHA?  
22 A. Dr. ElSohly's lab.  
23 THE REPORTER: Repeat the term.  
24 THE WITNESS: "ElSohly's lab."  
25 THE REPORTER: Okay, thank you.

1 I. Khan

2 Q. So they did the work, but they never  
3 published that work; correct?

4 A. That's what they are talking about  
5 ion, missing ion, yes. They give the evidence  
6 in the second paper.

7 Q. Okay. So you're saying in the second  
8 paper, they confirmed that this impurity was  
9 not MHA?

10 A. Yeah. It -- it was confirmed in this  
11 paper too, but they highlighted again because  
12 of the question raised about three ions.

13 Q. Okay. Well, you say it was confirmed  
14 in this paper, but this paper says the impurity  
15 was MHA.

16 A. Yeah.

17 Q. Doesn't say it was something else.  
18 It says it was MHA; correct?

19 A. The MHA impurity was confirmed with  
20 the [unintelligible] for three ions --

21 THE REPORTER: Confirmed with the?

22 THE WITNESS: Three ions.

23 THE REPORTER: Oh.

24 Q. Okay. So let's -- let's back up.  
25 We've confirmed based on what you've just said

1 I. Khan

2 that the impurity was MHA based on those three  
3 ions. Okay?

4 And my initial question to you was  
5 did your lab ever determine how the sample  
6 became contaminated with MHA. And I thought  
7 your answer was it wasn't MHA, it was something  
8 else.

9 A. Yeah, after confirmation.

10 Q. Okay. So let's back up again. In  
11 this paper, the impurity is identified as MHA;  
12 correct?

13 A. Looks like it.

14 MR. DAVENPORT: Object to form.

15 Q. Yes.

16 MR. DAVENPORT: Okay.

17 Q. Yes?

18 A. Looks like MHA.

19 Q. Okay. And as you sit here today, to  
20 your knowledge, did anyone make a determination  
21 of how the sample became contaminated, whether  
22 the contaminant was actually MHA or later  
23 determined to be something else?

24 A. Yeah, that's where the three ion  
25 confirmation we started off.

1 I. Khan

2 Q. No, I'm asking you how it became  
3 contaminated. Do you know how --

4 A. No, I --

5 Q. -- the sample became contaminated?

6 A. -- don't. I don't know.

7 Q. As you ran the studies in this paper,  
8 did you notice any change to the level of  
9 detection or the sensitivity of the equipment?

10 A. Not that I'm aware of.

11 Q. Do you know if the equipment was  
12 cleaned between each sample?

13 A. That should be written, cleaning  
14 procedure.

15 THE REPORTER: I'm sorry? Repeat  
16 it.

17 THE WITNESS: That should be  
18 written [unintelligible] cleanup  
19 procedure.

20 THE REPORTER: I -- I don't -- I  
21 don't understand.

22 MR. DAVENPORT: That should be  
23 written in the cleaning procedure.

24 THE REPORTER: Thank you.

25 Q. I don't see any section of this paper

1 I. Khan

2 called Cleaning Procedure, so --

3 A. Okay. That should be provided by  
4 ElSohly's lab.

5 Q. So it's not in this paper?

6 A. Yeah.

7 Q. Do you know if standards were ran --  
8 excuse me -- standards were run between each  
9 sample?

10 A. Again, this protocol, I don't recall  
11 it, but yes. Whether it was run after each  
12 sample or after three sample, I don't know, but  
13 should be run.

14 Q. It should be done?

15 A. Yeah.

16 Q. And again, this paper doesn't discuss  
17 that; correct?

18 A. Yes.

19 Q. Okay.

20 (Khan Exhibit No. 7 was marked for  
21 identification.)

22 BY MS. WOOLSON:

23 Q. Take a minute to review it and let me  
24 know when you're ready to discuss it.

25 MR. DAVENPORT: I'm not sure I have

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1 I. Khan  
 2 the complete report again.  
 3 (Discussion held off the record.)  
 4 BY MS. WOOLSON:  
 5 Q. So I'm showing you Exhibit 7,  
 6 Dr. Khan. Have you seen it before?  
 7 A. Yes.  
 8 Q. And what is it?  
 9 A. This is multicenter study.  
 10 THE REPORTER: I'm sorry?  
 11 A. Multicenter study.  
 12 Q. And is this the second paper that we  
 13 talked about this morning?  
 14 A. That's right.  
 15 Q. Okay. And I see Dr. ElSohly, I see  
 16 Dr. Gul, I see your name on there.  
 17 Who is Candice Tolbert?  
 18 A. Candice is -- is tech person in  
 19 ElSohly's --  
 20 Q. Okay.  
 21 A. -- lab.  
 22 Q. We talked about Kareem ElSohly.  
 23 A. Yeah.  
 24 Q. Who is Timothy Murphy?  
 25 A. He's -- he's a senior analytic --

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1 I. Khan  
 2 Q. Okay. Now, tell me how this study  
 3 came to be.  
 4 A. This one came because after  
 5 publishing first paper, the criticism was that  
 6 we analyzed sample from India and we did not  
 7 analyze any sample from China. And according  
 8 to Dr. Khan, the natural variation can be --  
 9 from different region can produce different  
 10 sample.  
 11 Q. According to doctor who?  
 12 A. Dr. Khan.  
 13 Q. Dr. Khan?  
 14 A. That's me.  
 15 Q. Okay.  
 16 A. That's what's referred to in the  
 17 paper.  
 18 Q. I wanted to make sure there wasn't  
 19 another Dr. Khan out there.  
 20 A. No, this is -- has been heavily  
 21 referred that -- my paper, that the natural  
 22 variation does occur. So since we are  
 23 seriously investigating is there or not, so  
 24 that criticism [unintelligible] was taken  
 25 seriously, and --

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1 I. Khan  
 2 analyst in that -- ElSohly's lab.  
 3 Q. We talked about Dr. Avula?  
 4 A. Yeah.  
 5 Q. And we've talked about Dr. -- I'm  
 6 going to go with "Amar" because --  
 7 A. Yeah, yeah.  
 8 Q. -- it's just easier for me to say.  
 9 Who is Dr. Wang?  
 10 A. Wang is also analytical chemist,  
 11 works on -- in our center.  
 12 Q. So he -- she -- he or she?  
 13 A. She.  
 14 Q. She works at the center?  
 15 A. Yeah.  
 16 Q. Okay. And who is Dr. Yang?  
 17 A. Dr. Yang works with Dr. De-an Guo in  
 18 Shanghai Institute of Materia Medica.  
 19 THE REPORTER: Sir?  
 20 THE WITNESS: Shanghai Institute of  
 21 Materia Medica.  
 22 Q. And Dr. Zhang and Dr. Su?  
 23 A. They work in Second Military  
 24 School -- School of Pharmacy, Second -- Second  
 25 Military Medical University Shanghai.

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1 I. Khan  
 2 THE REPORTER: So that?  
 3 THE WITNESS: That criticism.  
 4 THE REPORTER: Criticism?  
 5 THE WITNESS: And suggestions.  
 6 THE REPORTER: And suggestions?  
 7 THE WITNESS: Yeah. Were taken,  
 8 and we thought it better to do a study  
 9 and include the sample from China.  
 10 Q. Okay. And the samples that you got  
 11 from China, what region of China did they come  
 12 from?  
 13 A. This sample was collected by the same  
 14 person who collected the sample for the studies  
 15 for Fleming and Li, and they come from Yunnan  
 16 (phonetic) province.  
 17 Q. And the samples that Dr. Fleming,  
 18 Dr. Li both tested and confirmed had DMAA in  
 19 it, what region of China did those samples come  
 20 from?  
 21 MR. DAVENPORT: Objection to the  
 22 form of the question. You can answer.  
 23 A. They found DMAA in dia -- in the --  
 24 in diastereomeric form, sample they analyzed,  
 25 so I hope it does not imply that they found

1 I. Khan  
 2 naturally. Having said that --  
 3 THE REPORTER: It -- it does not?  
 4 THE WITNESS: "Imply."  
 5 THE REPORTER: That they found?  
 6 THE WITNESS: Naturally.  
 7 THE REPORTER: Oh, "naturally."  
 8 THE WITNESS: Right.

9 A. But the samples were, if I recollect,  
 10 they were Yunnan (phonetic), Guizhou  
 11 (phonetic), and Changzhou (phonetic) region,  
 12 which are almost three -- close to 2,000  
 13 kilometer apart from each other.

14 Q. So you didn't collect any samples for  
 15 your study from the Changzhou region; correct?

16 A. No, because we asked the person in  
 17 China -- for us to analyze the sample, we have  
 18 to contact somebody where we can get the sample  
 19 from, and that person was the one that provided  
 20 from the Yunnan province sample, so we assumed  
 21 that he is going to provide the similar region  
 22 sample.

23 Q. You assumed. What did you do to  
 24 confirm that?

25 A. Because that's what the Yunnan sample

1 I. Khan  
 2 that came from provided by the same person.  
 3 Q. But you didn't get a sample from the  
 4 Changzhou region; correct?

5 A. Yes, we did not got the sample from  
 6 Changzhou.

7 Q. Okay. And -- and you didn't run the  
 8 sample from the Yunnan region against the  
 9 sample from -- against a sample from the  
 10 Changzhou region; correct?

11 A. We asked the person in China to  
 12 provide us the Pelargonium samples. If he  
 13 would have provided from 10 different places,  
 14 we would have taken 10. We did not tell them  
 15 to provide only from Yunnan.

16 Q. Okay. But you didn't also ask him to  
 17 provide you one from Changzhou either, did you?

18 A. There is no reason for us to because  
 19 we are not trying to repeat somebody's study.  
 20 We are trying to find out -- collect as many  
 21 sample as we can to see whether is a -- that  
 22 objection that we did not have a sample from  
 23 China, is it valid or not.

24 Q. Okay. And if you were trying to do a  
 25 comparison of your study to the Li study or the

1 I. Khan  
 2 Fleming study, it would be helpful to have  
 3 plants that come from the same region; correct?  
 4 A. It -- yes. And Yunnan is the same --  
 5 same area there where they got the sample from.  
 6 So we do have representative sample.

7 But if you look at the Fleming and  
 8 Li, they are contradicting each other also.

9 Q. Well, when you --

10 A. So -- so unless -- unless you're  
 11 talking about a particular sample that  
 12 questioned that we did not try to do it, even  
 13 we got the sample from Yunnan, that is, we  
 14 didn't get from Changzhou. So I think this --  
 15 this is -- I'm not sure what your question is.

16 We did try to do our best to collect  
 17 the sample, representative sample from the same  
 18 region. We didn't go somewhere else.

19 Q. But you -- my question was a very  
 20 simple question, which was you didn't run a  
 21 sample comparing -- you didn't run a study  
 22 comparing your sample from the Yunnan province  
 23 with a sample of a plant from the Changzhou  
 24 region. You didn't do that; right?

25 A. We didn't have sample from Changzhou.

1 I. Khan  
 2 Q. Was there any reason why you couldn't  
 3 get a sample from the Changzhou region?

4 A. We contacted the person who provided  
 5 a sample for this study. We said we would like  
 6 to have sample, and he provided from Yunnan.

7 Q. That wasn't my question.

8 My question was: Is there any reason  
 9 why you couldn't get a sample from the  
 10 Changzhou region?

11 A. We had to have somebody to collect  
 12 and provide the sample to us.

13 Q. So your testimony is you didn't get a  
 14 sample from the Changzhou region because you  
 15 couldn't find someone to provide you with a  
 16 sample?

17 A. The Chin He (phonetic), who collected  
 18 a sample, provided us only from Yunnan.

19 Q. And did you say to that person, we  
 20 would also like a sample from the Changzhou  
 21 region?

22 A. No.

23 Q. All right. So tell me about the  
 24 method that you used in -- or methods that you  
 25 used in this study.



1 I. Khan

2 A. So one of the criticism was that our  
3 recovery rate is slow, which is -- if you look  
4 at the Fleming paper, they had a 19 percent  
5 recovery. So we used the Li methods and  
6 adjusted based on the ratio of the plant. So  
7 extraction procedure was done accordingly as  
8 reported by Li.

9 Q. Okay, let me stop you there. When  
10 you say you did the sample -- the method or  
11 sample preparation according to Li, did you do  
12 it at the exact same quantities and volumes as  
13 Li?

14 A. No. As I mentioned, as I mentioned  
15 earlier, volume were adjusted based on the  
16 concentration we were using.

17 Q. And you were using less plant  
18 material, basically -- basically like tenfold  
19 less plant material than Li?

20 A. In the -- but we had the one -- the  
21 one-tenth of the volume, also, so --

22 Q. I'm just asking the question. Did  
23 you use tenfold less material than Li?

24 A. With the tenfold less solvent, so  
25 concentration is the same.

1 I. Khan

2 Q. Okay. So am I correct that you used  
3 about a gram of plant material and Li used  
4 about 10 grams of plant material?

5 A. We used 1 gram in 5 milliliter, he  
6 used 10 gram in 100 milliliter, so the  
7 concentration should be double than what he  
8 had.

9 Q. Your concentration was double?

10 A. Because we used 1 gram into 5 ml.

11 Q. So you --

12 THE REPORTER: Into 5?

13 THE WITNESS: Ml. Milliliter.

14 THE REPORTER: Ml? Ml. Thank you.

15 Q. So you doubled the concentrations  
16 that Li used? Is that what you're saying?

17 A. No, not in this paper. What I'm  
18 saying is if you look at the volume, if your  
19 question is they used 10 gram and we used 1  
20 gram --

21 Q. Uh-huh.

22 A. -- they used 10 gram in 100  
23 milliliter, we used 1 gram in 10 milliliter,  
24 which is equivalent.

25 Q. I agree with you. But that's not

1 I. Khan

2 what you said previously so I just wanted to  
3 clarify that. Okay.

4 When you're dealing with small  
5 volumes --

6 A. Uh-huh.

7 Q. -- of material and you're dealing  
8 with low recoveries to begin with, doesn't that  
9 affect your overall recovery of the sample and  
10 the -- and the compound that you're trying to  
11 isolate?

12 A. That's why the recovery experiments  
13 are run, to determine it.

14 Q. Okay. But my question is if you are  
15 starting with something that's difficult to  
16 recover to begin with, where you have a low  
17 recovery rate, and you're self-limiting to  
18 using only a gram of material; right? So  
19 aren't you -- inherently, isn't your yield  
20 going to be less? Just in a sheer gram, not a  
21 percentage-wise, but sheer number of gram-wise  
22 of the product than Li or Fleming?

23 A. Once you extract the sample, you get  
24 a certain volume and you inject certain volume.  
25 So ratio, as mention earlier, if you take 10

1 I. Khan

2 gram in 100 milliliter --

3 Q. Uh-huh.

4 A. -- or 1 gram in 10 ml, it's the same.  
5 End of the day when you are -- when you inject  
6 it, they should have the same concentration.

7 Q. I'm not talking about the volume.  
8 I'm asking you a question strictly on a basic  
9 level of grams of material.

10 You would agree with me, if you --  
11 you start with less grams, you're going to end  
12 up with less grams? Not talking about the  
13 concentration, I'm just talking about sheer  
14 weight of material. Right?

15 A. Yeah, sample -- sample extract, if  
16 you are talking about how much extract we are  
17 going to get from 10 versus 100, yes, that will  
18 be different.

19 Q. Okay. And would you agree with me  
20 that the error rate between laboratories  
21 working on a small scale of sample can be as  
22 high as 50 percent?

23 MR. DAVENPORT: I'm going to object  
24 to the form of the question. You can  
25 answer, Dr. Khan.

1 I. Khan  
 2 A. You are talking about within the  
 3 laboratory, or you are talking about the other  
 4 laboratories?  
 5 Q. Between laboratories.  
 6 A. Between laboratories, everybody is  
 7 going to determine their limits, so --  
 8 Q. Well, that -- that wasn't my  
 9 question. My question was, do you agree with  
 10 me that if you had two laboratories working  
 11 with the same compound, doing the same  
 12 procedure, that the error rate can be as much  
 13 as 50 percent between the two laboratories?  
 14 A. Should not be. If they have done the  
 15 full method validation.  
 16 THE REPORTER: The full?  
 17 THE WITNESS: Method validation.  
 18 THE REPORTER: Yes, thank you.  
 19 Q. So you think that two laboratories  
 20 should be 100 percent the same?  
 21 A. I mean, that's why we run them  
 22 several labs, to compare the results from each  
 23 lab. And it should be comparable. And if it  
 24 is a big different, then it should -- has to go  
 25 back and look at where it happened. That's

1 I. Khan  
 2 A. 786, yes.  
 3 Q. And where? Is the paragraph  
 4 "Finally, figure 7"?  
 5 A. Yeah.  
 6 Q. Well, I'm not sure what you're trying  
 7 to -- to -- to -- to tell us because that's  
 8 talking about comparison to a control sample at  
 9 10 nanograms per milliliter.  
 10 A. Figure 7 shows the example of  
 11 [unintelligible] --  
 12 THE REPORTER: I'm sorry, sir?  
 13 Shows?  
 14 A. Figure 7 shows example of the  
 15 LC-MS-TOF chromatograms for -- for two extracts  
 16 of two oil samples as well as those of sample  
 17 of young and mature leaves in one stem sample  
 18 as compared to that of control sample.  
 19 Q. So how does that tell me your -- your  
 20 level of detection? I -- I'm sorry, your  
 21 detection validation?  
 22 A. Yeah, let me see. "Qualification  
 23 procedure is --"  
 24 THE REPORTER: I'm sorry, sir. If  
 25 you are reading for the record, you need

1 I. Khan  
 2 what the method validation -- interlevel  
 3 (phonetic) method validation is all about. So  
 4 you are trying to see the vary -- variation in  
 5 different labs, but everybody has their own  
 6 method validation done.  
 7 Q. What was the -- well, when you say  
 8 everybody has their own method of validation  
 9 done, what was the difference between the  
 10 method of validation for your lab and the  
 11 Shanghai Institute and the School of Pharmacy  
 12 in this study?  
 13 A. That's where it's written in tables.  
 14 So table 2 is describing for Shanghai -- Second  
 15 Military Medical University, Shanghai. Table 3  
 16 is for Materia Medica. And 10 nanogram per  
 17 milliliter --  
 18 THE REPORTER: 10?  
 19 THE WITNESS: Nanogram.  
 20 THE REPORTER: Per?  
 21 THE WITNESS: Milliliter.  
 22 THE REPORTER: Thank you.  
 23 Q. And where are you looking?  
 24 A. This last paragraph.  
 25 Q. Last page?

1 I. Khan  
 2 to read to me, and slowly.  
 3 A. 10 milligram.  
 4 Q. Okay. That paragraph says: "The LOD  
 5 and LOQ of the instrument were deduced by a  
 6 standard solution --"  
 7 A. Yeah.  
 8 Q. "-- of 10 nanograms per  
 9 milliliter --"  
 10 A. Yes.  
 11 Q. "-- with S/N 3.1 and 10.1  
 12 respectively. The LOD and LOQ of the method  
 13 were deduced by a recovery sample. The results  
 14 are shown in tables 2 through 5."  
 15 Tables 2 through 5 only deal with the  
 16 Shanghai Institute and the Military --  
 17 A. Uh-huh.  
 18 Q. -- Military Medical University. I  
 19 don't see any tables regarding the work that  
 20 was done by ElSohly or Phytochemical Services  
 21 or the Natural Product Center -- National  
 22 Center for Natural Products.  
 23 A. Yeah. So MHA showed fragmentation  
 24 ion, and the limit of detection for this method  
 25 was estimated as 10 ppb.

1 I. Khan  
 2 Q. And where are you now?  
 3 A. It's -- it's the last line of the  
 4 second page.  
 5 Q. Last line of the second page. And  
 6 this is -- I'm sorry. Can you show me where?  
 7 A. It's under it.  
 8 Q. Okay.  
 9 A. Here.  
 10 Q. Okay. Again, this is the limit of  
 11 detection for the LC --  
 12 A. TOF.  
 13 Q. -- Q-TOF method.  
 14 A. It was --  
 15 Q. Okay.  
 16 A. -- done by -- by the center.  
 17 Q. Okay. So your method -- your limit  
 18 of detection was 10 ppb; correct?  
 19 A. Yes.  
 20 Q. Okay. And then if we go over and we  
 21 look at table 2 --  
 22 A. Yeah.  
 23 Q. -- which is the level of detection  
 24 for the Military Institute --  
 25 A. Uh-huh.

1 I. Khan  
 2 that -- that's the purpose of -- if you find  
 3 that much variation within the lab, that should  
 4 not be acceptable. But four different methods,  
 5 four different techniques, then you have to  
 6 come up with [unintelligible], yes.  
 7 THE REPORTER: Then you have to?  
 8 THE WITNESS: Come up with a range.  
 9 THE REPORTER: "Come up with a  
 10 range"? Thank you.  
 11 Q. So there can be a wide range of  
 12 differences between laboratories performing the  
 13 same analyses; correct?  
 14 MR. DAVENPORT: Objection to the  
 15 form of the question. You can answer,  
 16 Dr. Khan.  
 17 A. That's not the rule.  
 18 Q. I'm basing this on the results we  
 19 just looked at.  
 20 A. No, I -- I'm --  
 21 Q. We go from 5 --  
 22 A. Yes.  
 23 Q. -- to -- to 28 parts --  
 24 A. That -- that -- that's --  
 25 Q. -- per billion; correct?

1 I. Khan  
 2 Q. -- that says 8?  
 3 A. Yeah.  
 4 Q. .8 what?  
 5 A. Limit of detection. Picogram.  
 6 Q. Picogram?  
 7 A. Yeah, yeah.  
 8 Q. And then if we look at table 3 --  
 9 A. Yeah.  
 10 Q. -- it says 28 and 5, right, for peak  
 11 1?  
 12 A. Yeah.  
 13 Q. So 28 micrograms per kilogram.  
 14 That's parts per billion?  
 15 A. Ppb, yes.  
 16 Q. Okay. And 5 parts per billion?  
 17 A. Yes.  
 18 Q. And your method was 10 parts per  
 19 billion?  
 20 A. Yeah.  
 21 Q. Okay. So you found a range of  
 22 anywhere from 5 to 28 parts per billion was  
 23 acceptable level of detection for the three  
 24 different laboratories?  
 25 A. That's -- being four different labs,

1 I. Khan  
 2 A. That's why the multi-lab validation  
 3 is good to have, because you'll see the  
 4 variation lower or higher. But as long as  
 5 people are using the same sample, we each  
 6 extract it. So minimize that variation, but  
 7 use a different technique so you get the  
 8 results, which should be comparable. Or, if  
 9 not, then we can discuss why not.  
 10 Q. Okay. And in this case, you've got  
 11 three labs performing analysis on plant  
 12 material. Did they all use the same exact --  
 13 A. Same exact --  
 14 Q. Let me finish the question. Same  
 15 exact preparation method?  
 16 A. Yes.  
 17 Q. Did they all use the same exact  
 18 analytical method?  
 19 A. No. They are -- they are using all  
 20 different methods.  
 21 Q. Okay. And so they are using all  
 22 different methods, and we have a range of  
 23 levels of detection from 5 parts per billion to  
 24 28 parts per billion; correct?  
 25 A. By this report, yes.

1 I. Khan

2 Q. Now, did all three labs analyze all  
3 of the samples?

4 A. Yes.

5 Q. Does -- anywhere in this report, do  
6 you list the results for all of the samples for  
7 all three labs?

8 A. In this lab -- let me read it,  
9 because it says it's provided in supplemental  
10 data, so I'm sure it -- it should be there.

11 Yeah. "Examples of chromatogram  
12 Pelargonium samples as it -- as is and again  
13 spiked with MHA are provided in the supporting  
14 document." So it should be available.

15 Q. But it's not in this paper; correct?

16 A. Supporting document generally is not  
17 included in the paper.

18 Q. Okay. And do you know if you gave  
19 the supporting documentation to your counsel?

20 A. This is coming from -- from ElSohly,  
21 so I cannot -- should have, but I'm not --

22 Q. Okay.

23 A. I mean, the -- all the data has been  
24 provided, so should be included.

25 Q. Okay. We're going to make a request

1 I. Khan

2 for the supplemental material.

3 In the interim, let me go back. I  
4 need to clarify one thing with you. The tables  
5 on -- tables 2 through 5, I think I  
6 inadvertently said that they included levels of  
7 detection for the Shanghai Institute. But  
8 that's not correct, is it? These are all for  
9 the Military Medical University.

10 A. Yes, but it -- it should be part of  
11 the supplemental we did.

12 Q. Is there some reason why the level of  
13 detection for the Shanghai Institute was not  
14 reported?

15 A. Should not be any reason.

16 Q. Did the Shanghai Institute report  
17 finding DMAA in any of the samples?

18 A. All the samples are negative.  
19 (Khan Exhibit No. 8 was marked for  
20 identification.)

21 MS. WOOLSON: Hopefully, all the  
22 pages are there.

23 MR. DAVENPORT: I'll check. You  
24 have a three-page document?

25 MS. WOOLSON: Yes.

1 I. Khan

2 MR. DAVENPORT: Okay. Exhibit 8?

3 THE REPORTER: Yes, sir.

4 MR. DAVENPORT: Thank you.

5 BY MS. WOOLSON:

6 Q. Have you seen Exhibit 8 before?

7 A. Yes.

8 Q. And what is Exhibit 8?

9 A. This is about communication between  
10 ElSohly and De-an Guo.

11 Q. And who?

12 A. No, wait. No, this is -- there are  
13 two emails here.

14 Q. So let's talk about the first one on  
15 page 1. Well, actually, I guess it's the  
16 second one on page 1. This was an email  
17 exchange between Dr. ElSohly and Dr. Yang;  
18 correct?

19 A. Dr. Guo. Yeah, yeah, Dr. Yang, yeah.  
20 Same group.

21 Q. Okay. And Dr. Yang is saying that in  
22 the earlier work she -- it's a she? Dr. Yang  
23 is a she?

24 A. He.

25 Q. He? Dr. Yang said in his earlier

1 I. Khan

2 work he analyzed the samples using the same  
3 extraction method with that of the literature  
4 but none of them showed detectable MHA, so he  
5 improved the extraction method and obtained the  
6 results sent to you previously; correct?

7 A. That's what it says.

8 Q. Okay. And if we go to the next page,  
9 it says -- this is Dr. ElSohly writing to  
10 Dr. De-an, and he says: "Your writeup shows  
11 fresh samples 1 and 2 to show a peak at the  
12 same RT of MHA but below LOQ." Correct?

13 A. Yeah.

14 Q. Meaning MHA was detected below the  
15 level of detection -- below level of  
16 quantification; correct?

17 A. Partially correct, but the next  
18 sentence, what he's trying to convey, he's  
19 talking about that having a peak does not mean  
20 [unintelligible] MHA.

21 THE REPORTER: I'm sorry? Having  
22 a?

23 THE WITNESS: Having a peak.

24 MR. DAVENPORT: Peak.

25 THE REPORTER: "Peak"?

1 I. Khan  
2 THE WITNESS: Peak. Does not mean  
3 this is MHA.  
4 Q. So in response to Dr. ElSohly's email  
5 saying finding a peak does not mean that you  
6 have MHA, Dr. Yang goes on, responding, saying  
7 this is what I found and this is what I did.  
8 A. Oh, yeah. Dr. ElSohly's asking him  
9 to confirm it. He is not saying you hide it.  
10 What he's saying is if you found it, you have  
11 to confirm it. Then he goes and improves it  
12 and follows the same protocol and then he  
13 doesn't find it.  
14 Q. No. Actually, when he improved the  
15 protocol, he found it; correct?  
16 A. But what he found as MHA, he did not  
17 confirm this is MHA.  
18 Q. I -- I'm -- I'm not saying he  
19 confirmed it; I'm saying this is what he's  
20 saying he found after he improved the protocol.  
21 A. Yeah, but you have to confirm. Other  
22 people have reported finding it too, but it  
23 doesn't mean it's there.  
24 Q. And what, if anything, did you do --  
25 "you" meaning your laboratory -- do to prove it

1 I. Khan  
2 in this email.  
3 Q. And so there's no NMR -- MRM for  
4 Dr. Yang's sample in your report --  
5 A. There's all this data --  
6 Q. -- and there -- and there's no  
7 mention of the detection; correct?  
8 A. Yeah, detection limit is 10 ppb.  
9 That's what it says in the paper up front.  
10 Q. So in other words, if you detect  
11 something that could be MHA below the detection  
12 limit, you're not going to report it in your  
13 paper?  
14 A. You have to confirm it before you  
15 report it.  
16 Q. Okay. And again, I asked you, what  
17 steps did you do to confirm it?  
18 A. Yeah, you take the MRM, you analyze  
19 it, you do the high resolution mass spec to see  
20 whether --  
21 THE REPORTER: You do the?  
22 THE WITNESS: High resolution mass  
23 spec --  
24 THE REPORTER: Yes.  
25 THE WITNESS: -- to confirm it.

1 I. Khan  
2 wasn't there?  
3 A. Wasn't there?  
4 Q. Uh-huh.  
5 A. It's already not there.  
6 Q. Oh, so you did nothing to -- to --  
7 A. That's --  
8 Q. -- confirm --  
9 A. -- why --  
10 Q. -- that it --  
11 A. -- you --  
12 Q. -- was --  
13 A. -- the protocol.  
14 THE REPORTER: I'm sorry. I didn't  
15 hear the end of the question.  
16 Q. So you did nothing to confirm that  
17 that was not MHA that was detected?  
18 A. That's why you do the MRM, to confirm  
19 it.  
20 Q. And where is there an MRM on  
21 Dr. Yang's sample?  
22 A. It should be provided. It should be  
23 included. I don't have it here, but yes, what  
24 they are asking you, if you find it, you have  
25 to confirm it. That's what ElSohly is saying

1 I. Khan  
2 Q. Okay. And that's not in this paper?  
3 A. That's not in the paper.  
4 Q. Okay.  
5 (Khan Exhibit No. 9 was marked for  
6 identification.)  
7 MS. WOOLSON: Tell me when you've  
8 had a chance to look at 9.  
9 MR. DAVENPORT: You have a six-page  
10 document?  
11 MS. WOOLSON: Yes. The last page  
12 is 2272.  
13 BY MS. WOOLSON:  
14 Q. Have you seen Exhibit 9 before?  
15 A. Yes.  
16 Q. What is Exhibit 9?  
17 A. This is email exchange sent to De-an  
18 Guo and to me from -- from Min Yang.  
19 Q. Thank you. This is regarding the  
20 work that we looked at that was in Exhibit 7?  
21 The 2014 paper?  
22 A. Yeah.  
23 Q. This one.  
24 A. No, this one -- related to, yes,  
25 Exhibit 7.

1 I. Khan  
2 Q. Okay, okay. And in the first email,  
3 Dr. Yang is saying that "Checked the data and  
4 found that 2 nanograms per milliliter in DMAA  
5 in methanol control solution could be detected  
6 by the MRM method." Correct?  
7 A. Yeah.  
8 Q. And then he says: "I think  
9 2 nanograms per milliliter could be detected in  
10 the samples." Correct?  
11 A. That's what it reads, yeah.  
12 Q. And then immediately below that is an  
13 email from you to Dr. Yang saying you found  
14 10 -- 2 nanograms in samples, but it doesn't  
15 match the report from Professor Dong's lab --  
16 A. Yeah.  
17 Q. -- correct?  
18 A. Yeah.  
19 Q. So you're acknowledging that Dr. Yang  
20 found 2 nanograms of DMAA in some of the  
21 samples?  
22 A. Reporting. There's no confirmation  
23 at this point. That's why the exhibit --  
24 Q. So he's reporting that. Okay.  
25 A. He is saying that's what I found --

1 I. Khan  
2 A. They are what it says.  
3 Q. It says that the isomer of DMAA was  
4 detected in five samples; correct?  
5 A. That was written here.  
6 Q. Okay. Was any of that in the paper  
7 that was published? Exhibit 7?  
8 A. So --  
9 Q. Yes or no?  
10 MR. DAVENPORT: Objection.  
11 Q. That's the answer, yes or no. Was it  
12 in the paper or was it not in the paper?  
13 MR. DAVENPORT: Same --  
14 Q. I haven't asked you why yet.  
15 MR. DAVENPORT: Same objection to  
16 the form of the question.  
17 A. This method -- this is still work in  
18 progress. The email was sent to him to confirm  
19 it. His confirmation was that no, I did not  
20 find it. So this one, because somebody was  
21 working on it without confirmation, shouldn't  
22 become a part of the publication. It generally  
23 does not happen.  
24 Q. Okay.  
25 A. Unless you have a confirmation, you

1 I. Khan  
2 Q. Uh-huh.  
3 A. -- and since we are multicenter  
4 study, we [unintelligible] --  
5 THE REPORTER: And since we?  
6 THE WITNESS: Multicenter study.  
7 THE REPORTER: Yes.  
8 THE WITNESS: We would like to  
9 confirm the results.  
10 THE REPORTER: Yes.  
11 THE WITNESS: And that's where this  
12 Exhibit 8 even was, can you confirm it.  
13 Q. Uh-huh. And -- and you -- and you  
14 wanted him to confirm it using an MRM; correct?  
15 A. Yeah.  
16 Q. Okay, let's turn to page 3. These  
17 are MRMs of the plant samples taken by Shanghai  
18 Institute; correct?  
19 MR. DAVENPORT: We're at 2270?  
20 MS. WOOLSON: Yes.  
21 A. Yes.  
22 Q. Yes?  
23 A. Yes.  
24 Q. And it says that DMAA was detected in  
25 samples 1 and 2; correct?

1 I. Khan  
2 do not write into scientific paper.  
3 Q. Okay. You told me earlier that the  
4 confirmation would be an MRM, which you have in  
5 Exhibit 9; correct?  
6 A. Yeah, but this is the same when we  
7 asked him and he went back and he -- he was not  
8 able to confirm it.  
9 Q. No, this is the confirmation;  
10 correct?  
11 A. No, this is in April, and this is in  
12 May.  
13 Q. Okay. And in May --  
14 A. May's the one that ElSohly's asking  
15 him to repeat it, confirm it. That was in  
16 April.  
17 Q. And where is the test where he  
18 repeated it and couldn't find it?  
19 A. That should -- all should be  
20 available to you. I'm sure that all -- in  
21 discovery all the documents would be available.  
22 Q. I don't see where Dr. Yang is talking  
23 about doing any other tasks. What he said was  
24 I improved the -- the extraction method and I  
25 found the results I sent to you previously,

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1 I. Khan  
 2 which were these in Exhibit 9; correct?  
 3 A. This is -- this is in April. The  
 4 last email when Mahmoud ElSohly was asking him  
 5 to confirm it, you don't have that data right  
 6 now, but that data should be available to you.  
 7 Q. I -- I don't see anywhere where he's  
 8 talking about redoing the -- the analysis.  
 9 What he says was, I rewrote my works; correct?  
 10 A. Without doing it?  
 11 Q. I'm -- I'm asking you. This email --  
 12 A. No --  
 13 Q. Where does it --  
 14 A. -- I -- I'm --  
 15 Q. -- say he's doing an analysis? It  
 16 doesn't, does it? It says, I rewrote my paper.  
 17 A. If you're questioning the integrity  
 18 of the Shanghai Institute of Materia Medica,  
 19 that people are just, like, printing the  
 20 results?  
 21 Q. I am not questioning the integrity of  
 22 the Shanghai Institute. No, I'm not.  
 23 A. So I'm sure the data should be  
 24 available.  
 25 Q. Well, if it is, we would certainly

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1 I. Khan  
 2 the paper, and they did not find it.  
 3 Q. Where in the paper does it discuss  
 4 the fact that there was a detection that was  
 5 subsequently eliminated? Nowhere; correct?  
 6 Nowhere in this paper does it discuss  
 7 there was a possible detection that was  
 8 eliminated?  
 9 A. This is -- is work in progress.  
 10 Q. This is a published paper.  
 11 A. This is published paper. If it says  
 12 they did not find it, they better have the  
 13 results. They better have [unintelligible] or  
 14 it's not --  
 15 THE REPORTER: They better have?  
 16 THE WITNESS: The results to show  
 17 it, the data to show it.  
 18 Q. But my question to you is where in  
 19 this paper is there a mention that we found  
 20 this detection and we ruled it out using thus  
 21 and such method? There's no discussion  
 22 anywhere in this paper about that, is there?  
 23 A. Yeah, but this -- this paper, this  
 24 short communication, it says the data is  
 25 provided in supplemental. These are the papers

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1 I. Khan  
 2 like to see it, and we will request that it be  
 3 produced.  
 4 Now, notwithstanding that, my  
 5 question was, with regard to Exhibit 7, which  
 6 was published in August of 2014, so over a year  
 7 later, there's no reference anywhere in this  
 8 paper to the results that were detected by the  
 9 university of Shanghai, are there?  
 10 A. What do you mean by "detected"? We  
 11 confirm we did not find it.  
 12 Q. Where --  
 13 A. The same --  
 14 Q. -- is the confirmation?  
 15 MR. DAVENPORT: Hold on.  
 16 A. The confirmation of what?  
 17 Q. Where --  
 18 A. That we -- this is the confirmation.  
 19 We wrote in the paper that we did not detect  
 20 it. That's the confirmation.  
 21 Q. You didn't --  
 22 A. Now you do not have the detailed  
 23 results that you're asking that should be  
 24 available to you. But where is the  
 25 confirmation of what? Is already confirm in

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1 I. Khan  
 2 are very concise and precise, and you provide  
 3 the final data. Unless somebody is being  
 4 accused of hiding the data and misinterpreting  
 5 it, there's no way that these final results are  
 6 presented here that something is -- somebody's  
 7 going to hide anything.  
 8 Q. Where in this report is there a  
 9 single chromatogram or result from Shanghai  
 10 Institute?  
 11 A. All should be available in  
 12 supplemental data. If you want, you can --  
 13 I'm -- I'm sure it will be available. If you  
 14 found these emails, I'm sure you should have  
 15 all the data too.  
 16 Q. So I guess the answer to my question  
 17 is it's not in the paper; correct?  
 18 A. Paper is also the final four studies.  
 19 One study [unintelligible] publish in --  
 20 THE REPORTER: One study? I'm  
 21 sorry.  
 22 A. One study required several paper,  
 23 full publication. This is summarizing the  
 24 finding of four labs in one paper. So  
 25 generally, in scientific community you provide

1 I. Khan  
2 the supplement data and do not make it very  
3 heavy publication with all the details. So  
4 yes, details are not available but it should be  
5 made available in supplemental data.  
6 Q. Uh-huh. And in -- in the conclusion  
7 to your report is: "27 different samples of  
8 the Pelargonium plant material and oils from a  
9 variety of sources were analyzed by four  
10 different laboratories. None of the  
11 laboratories found any MHA in any of the  
12 samples at the detection levels of the methods  
13 used. These results support previous reports  
14 that MHA found in dietary supplements is not of  
15 natural origin." Correct?  
16 A. Yes.  
17 Q. Correct. But yet we have an MRM in  
18 Exhibit 9 that shows the detection of DMAA in  
19 plant material; correct?  
20 MR. DAVENPORT: I'm going to object  
21 to the form of the question. You can  
22 answer, Dr. Khan.  
23 A. No, we did not find.  
24 Q. Isn't that what this Exhibit 9 says?  
25 Isn't that what the MRM says? That MHA was

1 I. Khan  
2 at Exhibit 10.  
3 MR. DAVENPORT: This is a  
4 three-page document?  
5 MS. WOOLSON: Yes. It's 27811 to  
6 13.  
7 BY MS. WOOLSON:  
8 Q. Exhibit 10, have you seen that  
9 before?  
10 A. Yes.  
11 Q. And what is Exhibit 10?  
12 A. This is a different technique for  
13 detecting a DMAA.  
14 Q. This is the third study that we  
15 talked about this morning?  
16 A. Yes.  
17 Q. Is this the last study that you've  
18 done on DMAA?  
19 A. On DMAA, yes.  
20 Q. Okay. Are you currently doing any  
21 other studies on DMAA?  
22 A. No, we published an insecticide  
23 electivity which came, I believe, after this.  
24 Q. And the --  
25 A. But that was on geranium, the plant,

1 I. Khan  
2 detected?  
3 A. This is confirmation. This is in  
4 April. In May, he asked you to -- to look at  
5 your data back. You read the email with it  
6 saying -- not saying that you -- to hide the  
7 results. He is saying confirm, because you are  
8 finding something, so you better confirm it.  
9 And that's a confirmation.  
10 Q. I -- tell me in this email where you  
11 see any effort to do additional research to  
12 confirm.  
13 A. How do you confirm without doing  
14 additional research?  
15 Q. That's what I'm asking you.  
16 A. That -- that's what I'm saying. They  
17 should -- data should be there.  
18 Q. Well, if you can find the data, we'd  
19 love to see it.  
20 A. Yes.  
21 (Khan Exhibit No. 10 was marked for  
22 identification.)  
23 BY MS. WOOLSON:  
24 Q. Before we get to Exhibit 10 I just  
25 have a follow-up -- actually, go ahead and look

1 I. Khan  
2 not the DMAA.  
3 Q. Okay. And we -- we talked about that  
4 this morning. You said it wasn't specifically  
5 about DMAA.  
6 A. Yeah.  
7 Q. How does this method differ, if at  
8 all, from the method you used in Exhibit 7?  
9 A. This method is a DART. Without  
10 processing the sample, you can do the direct  
11 analysis. So this is being -- right now, being  
12 a new technique, people are trying to use this  
13 technique to identify the contaminations in --  
14 where they were looking. They were looking  
15 like pharmaceuticals, food. So this is a new  
16 technique they're trying to utilize and look at  
17 the detection limit.  
18 Since we bought this equipment of the  
19 detector, we wanted to see so we had a sample  
20 sent and tried to see how reproducible it is.  
21 Q. Okay. And you had plant samples.  
22 How many plant samples did you have for this?  
23 A. I will say -- commercial sample so  
24 I'm sure we had at least minimum of -- plant  
25 sample?



1 I. Khan

2 Q. Uh-huh. If -- if it's helpful, on --  
3 on the first page it says "Chemical and plant  
4 samples."

5 A. Yeah, so it -- it does have a  
6 plant -- alternative plant samples. Stem and  
7 leaves. So whatever was in our collection must  
8 have been how many -- let me see. Should have  
9 been couple of plant material.

10 THE REPORTER: Couple of?

11 THE WITNESS: Plant material.

12 THE REPORTER: Plant material?

13 Thank you.

14 Q. If you look at the second page,  
15 figure 1 shows the mass specs.

16 A. Yeah.

17 Q. And I guess if you look on the bottom  
18 of that chart, it's got geranium plant 1, 2, 3,  
19 4, so perhaps there were four samples?

20 A. Yeah, couple of -- three or four,  
21 probably.

22 Q. Okay. And where on this chart is the  
23 DART analysis for the standard of DMAA? Is  
24 that the thing at the top?

25 A. Yes.

1 I. Khan

2 Q. Okay. And that's at 114?

3 A. Yeah.

4 Q. And --

5 A. No, 116.

6 Q. 116 in the middle?

7 A. Yeah.

8 Q. Okay. All right. So when you're  
9 looking at these mass spec of the -- the plant  
10 material in particular --

11 A. Uh-huh.

12 Q. -- I'm only seeing basically two  
13 peaks at 114 and one at 113, it looks like.

14 A. Yeah, you are seeing this. It was  
15 probably, yeah, 114.

16 Q. So explain to me how the plant  
17 material was prepared for analysis.

18 A. These are the sample. You put the  
19 sample in the probe --

20 Q. Okay.

21 A. -- and that's -- so it's no bad  
22 section processed.

23 Q. Okay. And when you say you put the  
24 sample directly on the probe, are you saying  
25 you put, like, a leaf on the probe, or you do

1 I. Khan

2 something to the leaf and then you put that on  
3 the probe?

4 A. No, you just -- there's a sample  
5 holder between the DART analysis, so you -- you  
6 keep the sample in between, hold the sample  
7 when it's being bombarded.

8 Q. Okay. So then do you take a piece of  
9 the leaf and put it in the holder and then  
10 bombard it, or do you have to dissolve the leaf  
11 or --

12 A. No, you --

13 Q. -- do something else?

14 A. -- don't have to dissolve.

15 Q. You don't dissolve the leaf? Okay.  
16 And so you injected the whole plant  
17 or you -- injected's the wrong word. You  
18 bombarded the entire plant material?

19 A. Uh-huh.

20 Q. And you got one peak or two peaks in  
21 the mass spec?

22 A. Yeah.

23 Q. And we talked earlier this morning  
24 about the fact that geranium plants have at  
25 least 90 different components; correct?

1 I. Khan

2 A. Yeah, but this is not analysis. We  
3 are looking at targeted. This is not  
4 chromatographic separation at all.

5 So whatever is being -- at that time,  
6 with that energy, whatever is going to excite,  
7 you are going to record it. So this is not to  
8 be confused with chromatographic method where  
9 you separate the components.

10 So this one, when you do the laser,  
11 you do it -- this is called what is being  
12 excited, so you're going to do it very  
13 selective.

14 Q. Uh-huh.

15 A. So generally, the DART technique is  
16 used to find a particular component, not a  
17 regular screening of plant composition.

18 Q. And -- and -- and I understand that.  
19 But what I'm asking you is you did this  
20 particular analysis on a plant material that's  
21 supposed to have 90-odd components, and even  
22 allowing for the range at which you set the  
23 instrumentation, you found one, possibly two  
24 spikes, and that's it?

25 A. Whatever you find it. But again, you

1 I. Khan  
2 are not trying to look for 90 component. This  
3 is not a -- this technique is not replacement  
4 of all the other chromatograph technique  
5 because there is no separation going on in the  
6 peaks.

7 Q. Okay. And do you know what that peak  
8 is at 114?

9 A. No. It can be many, many  
10 possibilities.

11 Q. And there were -- just so I'm clear,  
12 there were no other papers between Exhibit 7  
13 and Exhibit 10; correct? On DMAA?

14 A. From us?

15 Q. Yes.

16 A. No.

17 Q. That you know of.

18 A. No, that's right.

19 Q. Okay.

20 (Khan Exhibit No. 11 was marked for  
21 identification.)

22 BY MS. WOOLSON:

23 Q. Have you seen Exhibit 11 before?

24 A. Yes.

25 Q. And what is Exhibit 11?

1 I. Khan

2 A. This is about the detection limit of  
3 DMAA.

4 Q. And is this regarding the detection  
5 limit on the study we just looked at, the DART  
6 study?

7 A. Yes.

8 Q. Okay. In this email from Dr. ElSohly  
9 to Dr. Avula, which you're copied on, at the  
10 end it says: "Furthermore, our results were  
11 corroborated by several other investigators  
12 (references) who reported absence of DMAA  
13 in --" what I assume is supposed to be poly --  
14 I can't pronounce it now --

15 A. Yeah.

16 Q. Geranium oil.

17 A. Yeah.

18 Q. "-- in multiple sources collected  
19 from various parts of the world and several oil  
20 samples bought on the open market."

21 And the question I have for you about  
22 that sentence is are there any other DART  
23 studies out there regarding DMAA of which  
24 you're aware?

25 A. No, as far as I know, there is no

1 I. Khan  
2 other studies.

3 Q. Okay. You can put that aside now.

4 In your report you reference a number  
5 of these studies that I assume are similar to  
6 the studies that Dr. ElSohly was referring to  
7 in his email, and I want to review them with  
8 you. If we can do it without marking the  
9 studies, fine. I have them, we can mark them  
10 if you want to look at them all. Whatever you  
11 and your counsel are comfortable with.

12 And so the first study I wanted to  
13 talk about was the Shellie study. You  
14 published papers with Dr. Shellie; correct?  
15 I'm on page 16 of your report. Paragraph 32.

16 A. Dr. Shellie. The question was have I  
17 published with her?

18 Q. Yeah, have you published with  
19 Dr. Shellie, yes. I'm not talking specifically  
20 about this article, this report in 32. I just  
21 want to know if you've ever published with her.

22 A. I don't recall it, but I can look at  
23 my CV. But I don't recall publishing with her.

24 Q. That's fine. We can come back to  
25 that.

1 I. Khan

2 Was the Shellie study that you are  
3 referring to in paragraph 32, was it specific  
4 to DMAA?

5 A. No. This is the Pelargonium  
6 analysis.

7 Q. So it was identifying a whole host of  
8 compounds that were in the --

9 A. Yeah.

10 Q. -- the plants?

11 A. That's right.

12 Q. Do you know what they did to prepare  
13 the sample for analysis?

14 A. I don't recall it.

15 MS. WOOLSON: Okay. Do you want to  
16 take a short break? We've been going  
17 for like an hour and change. And I can  
18 have the court reporter mark all the  
19 various studies. That way we can just  
20 flip through them real quickly.

21 MR. DAVENPORT: It's your  
22 deposition.

23 MS. WOOLSON: Just a suggestion.

24 MR. DAVENPORT: That's fine. All  
25 right. We can go off the record.

<p style="text-align: right;">Page 162</p> <p>1 I. Khan 2 (Recess taken.) 3 (Khan Exhibit No. 12 was marked for 4 identification.) 5 (Khan Exhibit No. 13 was marked for 6 identification.) 7 (Khan Exhibit No. 14 was marked for 8 identification.) 9 (Khan Exhibit No. 15 was marked for 10 identification.) 11 (Khan Exhibit No. 16 was marked for 12 identification.) 13 (Khan Exhibit No. 17 was marked for 14 identification.) 15 (Khan Exhibit No. 18 was marked for 16 identification.) 17 BY MS. WOOLSON: 18 Q. So I'm showing you Exhibit 12, which 19 is the Shellie report that is cited in your 20 expert report; correct? 21 A. Yes. 22 Q. Okay. Take a second and look at it 23 and let me know when you're ready to go. 24 A. Yes. 25 Q. Okay. So Exhibit --</p>	<p style="text-align: right;">Page 163</p> <p>1 I. Khan 2 A. 12. 3 Q. Exhibit 12 is the Shellie, Marriott 4 paper that is cited in your report. 5 A. Yes. 6 Q. Was the paper -- the study, rather. 7 Excuse me. Was the study specific to DMAA and 8 its detection? 9 A. No. 10 Q. And how did the authors identify the 11 various compounds that they found in their 12 chromatograms? 13 A. Based on retention time and molecular 14 weight. 15 Q. Did they also look at the library 16 spectra for those compounds? 17 A. Yes. And they also reported the 18 matching to more than 90 percent or more. 19 Q. And the matching of the compounds to 20 their spectrum in the library is similar to 21 what Ping did; correct? 22 A. No, that's not correct. 23 Q. Isn't that what Ping did? 24 A. Ping did not report quality matches. 25 Ping paper has wrong name, wrong molecular</p>
<p style="text-align: right;">Page 164</p> <p>1 I. Khan 2 weight. 3 Q. Okay. 4 A. Ping paper did not match and give the 5 quality of percentage which probably determined 6 the probability of component being there. 7 Ping -- none of it done in Ping paper. 8 Q. My question was, didn't Ping match 9 spectra of -- of the compounds that it found to 10 the library spectra? 11 A. We don't know which library he use. 12 He certainly did not use the library that we -- 13 we generally use so I can't comment on which 14 library did he use. 15 Q. Okay. What library do you usually 16 use? 17 A. Generally, NIST. 18 Q. Pardon me? 19 A. NIST, N-I-S-T. 20 Q. N-I-S-T? 21 A. Yeah. 22 Q. Is that the library that -- that 23 Shellie used? 24 A. Here, this is the library, some of 25 the library.</p>	<p style="text-align: right;">Page 165</p> <p>1 I. Khan 2 Q. So there's more than one library that 3 could be used? 4 A. Yes. So that the Agilent machines 5 generally -- 6 THE REPORTER: I'm sorry, what 7 machines? 8 THE WITNESS: Agilent. Agilent. 9 MR. DAVENPORT: Agilent. 10 THE REPORTER: Agilent machines? 11 THE WITNESS: Yeah, they come up 12 with the Wiley (phonetic) software. 13 THE REPORTER: With the? 14 THE WITNESS: Wiley software. 15 THE REPORTER: Wiley? 16 THE WITNESS: Yeah. 17 THE REPORTER: Wiley? Okay. 18 Q. So we've got the NIST -- 19 A. Yes. 20 Q. -- laboratory. We've got the Wiley 21 lab -- library -- excuse me. Not laboratory. 22 Library. Any other libraries you can think of? 23 A. I'm sure there are some more 24 databases that people have access to. 25 Q. So there's not just one library that</p>

<p style="text-align: right;">Page 166</p> <p>1 I. Khan 2 can be used then; correct? 3 A. Yeah, but there -- there are 4 standard, well -- well-recognized. Some 5 probably have their own in-house but generally 6 NIST and Wiley libraries are used. 7 Q. Okay. Where did the sample come 8 from? What was its geographic origin? 9 A. From Australia. 10 Q. Okay. You can put that paper aside. 11 And now I'm going to show you Exhibit 13. 12 MR. DAVENPORT: Four pages, yes? 13 THE WITNESS: Yeah. 14 A. Yes. 15 Q. So Exhibit 14 is the Lisi study 16 that's cited in your report? 17 A. 13. 18 Q. 13. Sorry. Yes, 13 is the Lisi 19 study that was cited in your report; correct? 20 A. Yes. 21 Q. And where were these samples taken 22 from, the plant samples? 23 A. Mostly from Australia, one from New 24 Zealand. 25 Q. Okay. And these authors treated the</p>	<p style="text-align: right;">Page 167</p> <p>1 I. Khan 2 plant samples with a hydrochloric acid and 3 tert-butyl methyl ether -- 4 A. Yes. 5 Q. -- correct? 6 A. Yes. 7 Q. Okay. And that's a different solvent 8 than the one that was used by either Fleming or 9 Li; correct? 10 A. Yes. 11 Q. Can you find the level of detection 12 in this report? 13 A. It did not mention it specifically, 14 but based on Dr. Simone calculation, it 15 was .1 ppm. 16 Q. So you're saying Dr. Simone 17 calculated -- 18 A. That's what it says in this report. 19 Q. But this paper doesn't have that 20 information; correct? 21 A. Not specifically, yes. 22 Q. And a rigorous paper would include 23 that information; correct? 24 A. Should be. 25 Q. I'm going to show you what's been</p>
<p style="text-align: right;">Page 168</p> <p>1 I. Khan 2 marked Exhibit 15. Exhibit 14 was a duplicate 3 of Exhibit 13 so I'm just skipping. 4 MR. DAVENPORT: So there is no 5 Exhibit 14? 6 MS. WOOLSON: Correct. 7 Q. So Exhibit 15 is the DiLorenzo 8 article that is cited in your report; correct? 9 A. Yes. 10 Q. Okay. Where -- can you tell me where 11 the plant samples came from? 12 A. From Italy. 13 Q. From Italy? 14 A. Yes. 15 Q. And the authors of this paper chose 16 to derivatize the plant products; correct? 17 A. Yes. 18 Q. And they made them the O -- the 19 ortho-thal -- aldehyde derivative; correct? 20 A. Yes. 21 MS. WOOLSON: We'll spell it for 22 you later. 23 THE REPORTER: Got it. 24 Q. To your knowledge, are they the only 25 authors that have chosen to use that particular</p>	<p style="text-align: right;">Page 169</p> <p>1 I. Khan 2 derivation method? 3 A. Because they are using HPLC UV, and 4 you have to derivatize in order to use 5 [unintelligible] to detect the -- 6 THE REPORTER: In order to use? 7 THE WITNESS: To detect, they have 8 to derivatize. 9 Q. That's because DMAA on its own does 10 not fluoresce; correct? 11 A. It does not have any chromophore. 12 THE REPORTER: Does not have any? 13 THE WITNESS: Chromophore. 14 THE REPORTER: Thank you. 15 Q. Now, the conclusion of this paper, 16 which is on the page marked government 20 -- 17 sorry, 027970, states that "DMAA is either, 18 one, absent from geranium; two, present at very 19 low concentrations (below 1.2 micrograms per 20 gram); three, occurs under rare and not yet 21 described growing conditions; or, four, is 22 present in very uncommon cultivars." 23 Do you see that? 24 A. Yes. 25 Q. So DiLorenzo didn't determine or</p>

<p style="text-align: right;">Page 170</p> <p>1 I. Khan 2 didn't conclude that DMAA did not exist in 3 plants; correct? 4 A. This is the correct way of talking 5 about science. So he did not find under his 6 detection limit, he did not find under his 7 conditions in the sample. But being as good 8 scientist, and there is nothing called absolute 9 in the science, if he's saying that if we did 10 find somewhere, it has to be extraordinary 11 condition to find it. 12 So he's being, like, these are my 13 results, we don't find it under these 14 conditions, so if it's there, it has to be some 15 reason, which can be uncommon cultivars, it can 16 be growing conditions, the list we discussed in 17 the morning. It can be anything. 18 So he is not closing that absolutely 19 is not there because he doesn't have anything 20 to support it. 21 Q. I'd like to show you -- show you 22 Exhibit 16. 23 A. Yes. 24 Q. Here it's got Exhibit 17, but it's 25 actually Exhibit 16, because I duplicated that</p>	<p style="text-align: right;">Page 171</p> <p>1 I. Khan 2 one too. 3 MR. DAVENPORT: All right. This is 4 the Zhang study, or Zhang article. 5 (Discussion held off the record.) 6 BY MS. WOOLSON: 7 Q. So Exhibit 16, this is the Zhang 8 article or study that's referenced in your 9 report, expert report; is that correct? 10 A. Yes. 11 Q. Did Zhang test any actual plant 12 material? 13 A. Probably oils. 14 Q. And does he indicate from what region 15 the oils came from? 16 A. The origin is in China, Egypt, so 17 it's according to manufacturer, but -- 18 Q. Okay. And we don't know what region 19 of China the samples came from; correct? 20 A. These are oils. 21 Q. How did Zhang go about doing the 22 analysis? 23 A. This one, they are looking in the 24 chirality and the ratio of diastereomers to -- 25 to the DMAA. So it's not about -- they are</p>
<p style="text-align: right;">Page 172</p> <p>1 I. Khan 2 trying to see -- compare what occurs. 3 If it is natural, it should not have 4 all four enantiomers, as we all agree, 5 including Li and Fleming. So everybody's 6 unanimous for that one. Yes, we should have a 7 different ratio. So they wanted to see whether 8 they -- there's any variation in chirality or 9 enantiomeric ratio. 10 Q. So it's your testimony that Li and 11 Fleming both believe that you can't have a 12 racemic mixture of a natural product? 13 A. According to their publication, yes. 14 Q. Okay. Well, we'll -- we'll get 15 there. 16 A. Yeah. 17 Q. And so my question was, what was the 18 method of detection? 19 A. Oh, they used a chiral -- the GC, and 20 also they used the LC method. 21 Q. Okay. And did they inject the oil 22 directly into the mass spec? 23 A. They derivatized with 24 [unintelligible] -- 25 THE REPORTER: I don't understand,</p>	<p style="text-align: right;">Page 173</p> <p>1 I. Khan 2 sir. Speak up. 3 THE WITNESS: They derivatized. 4 THE REPORTER: Advertised? 5 THE WITNESS: Derivatized. 6 THE REPORTER: Derivatized. 7 Q. If -- if I can draw your attention to 8 page 686 of the report under the "HPLC 9 Analysis." 10 A. Yes. 11 Q. Do you see in the first paragraph 12 under that subtitle it says: "When the 13 underivatized extracted residue of geranium 14 oils were directed -- were directly injected to 15 these mass spectrometers, the signal of DMAA 16 was greatly suppressed by the other geranium 17 oil components remaining in the residue"? 18 A. It's probable. 19 Q. Pardon me? 20 A. It's probable. 21 Q. Is that something known as a matrix 22 effect? 23 A. If we're looking at full -- fully 24 scan mode, yes. 25 Q. I'm sorry. If you're looking to</p>

<p style="text-align: right;">Page 174</p> <p>1 I. Khan 2 what? 3 A. Fully scan mode. If you are looking 4 for all the mass spec, the other chromatogram 5 in there, but if you are looking for single 6 molecule, then it should not be affected much. 7 Q. Okay. But according to them, the 8 signal for DMAA, a single molecule, was greatly 9 suppressed if they -- they directly injected 10 the oil onto the mass spec; correct? 11 A. Yeah. Oil -- oil is already very 12 concentrated anyway. 13 Q. So what's the practical effect of 14 having a very concentrated sample directed to 15 the mass spec? 16 A. You will not see very nice baseline 17 separation. 18 Q. In the studies that you've done on 19 DMAA, have you noticed any matrix effects as a 20 result of the techniques that were used or the 21 concentrations that were used? 22 A. That's what we do all the time. I 23 mean, the matrix effect is always there. 24 That's why we do the solvent extraction, we do 25 [unintelligible] extraction, we --</p>	<p style="text-align: right;">Page 175</p> <p>1 I. Khan 2 THE REPORTER: "We do"? That term 3 you just said. 4 THE WITNESS: Yeah, "solvent 5 extraction." 6 THE REPORTER: Yes. 7 THE WITNESS: And selective solvent 8 extraction. 9 Q. And every time you do an extraction, 10 there's some loss of product; correct? 11 A. I don't know what you mean. You 12 extract selectively so you leave lot behind, so 13 if you interpret it as a loss -- 14 Q. Let me rephrase the question. 15 Extraction procedure is not 100 percent; 16 correct? 17 You're not going to extract 18 100 percent of any compound in performing an 19 extraction; correct? 20 A. Try to get close to that. 21 Q. But you're not going to get 22 100 percent; correct? 23 A. Yeah. 24 Q. And what's the -- the average 25 efficiency of the extractions using the plant</p>
<p style="text-align: right;">Page 176</p> <p>1 I. Khan 2 material for DMAA in your studies? 3 A. I'll have to go back. I think it's 4 more than 50 percent. 5 Q. Well, whatever it is, it should be in 6 your papers; correct? 7 A. Yeah, it should be -- 8 Q. Okay. 9 A. -- in there. 10 Q. Okay. The Zhang paper also talks 11 about dansylation. What is that? 12 A. That's also derivatization for 13 [unintelligible] -- 14 THE REPORTER: I don't understand. 15 THE WITNESS: Derivatization. 16 THE REPORTER: Yes. 17 THE WITNESS: For LC method. 18 THE REPORTER: "Method"? Thank 19 you. 20 Q. And what's the effect of that? 21 A. It's -- derivatization is increasing 22 the sensitivity. 23 Q. It's increasing the sensitivity of 24 the instrument to be able to detect the 25 compound?</p>	<p style="text-align: right;">Page 177</p> <p>1 I. Khan 2 A. Yes, selectively. 3 Q. Does the paper include any 4 information on the recovery of the column using 5 dansylation? 6 A. The LOD for this method was 7 [unintelligible] for -- 8 THE REPORTER: The LOD? 9 THE WITNESS: Was 10 ppb for DMAA 10 in geranium oil. 11 THE REPORTER: In? 12 THE WITNESS: Geranium. 13 THE REPORTER: Oh, "geranium oil"? 14 Thank you. 15 MS. WOOLSON: That was not actually 16 the question that I had, but that's 17 okay. 18 Q. And so Zhang doesn't conclude that 19 there is no DMAA in geranium samples; correct? 20 They simply say they didn't detect it 21 above 10 ppb; correct? 22 A. They did not analyze geranium sample. 23 Q. I'm sorry. Geranium oil sample. 24 A. Geranium oil sample. 25 Q. So -- correct.</p>

1 I. Khan

2 A. Yes.

3 Q. Okay. Have you ever encountered or  
4 heard of a solvent effect masking DMAA?

5 A. In analysis?

6 Q. Uh-huh, yes. In terms of interfering  
7 with the ability to detect it.

8 A. I don't recall it.

9 MS. WOOLSON: Okay, I'm going to  
10 show you what's been marked 18. 18  
11 should go from 183 to 187 in terms of  
12 pages.

13 MR. DAVENPORT: Doesn't have a  
14 Bates stamp on it?

15 MS. WOOLSON: No, it doesn't.

16 MR. DAVENPORT: Was it produced by  
17 you?

18 MS. WOOLSON: I don't know if it  
19 was produced by us. It wasn't part of  
20 Dr. Simone's -- I don't believe it was  
21 part of his reliance materials. It was  
22 something that was referenced in one of  
23 the papers that was I think produced by  
24 the government.

25 MS. JAMPOL: I think there was an

1 I. Khan

2 agreement that if something was publicly  
3 available and it's referenced.

4 MR. DAVENPORT: No, that's fine. I  
5 haven't -- I'm not stating any objection  
6 on -- on the basis of by whom it was  
7 produced, I'm just wondering if it -- I  
8 didn't see a Bates number on it.

9 MS. WOOLSON: It's because I  
10 printed it out yesterday and it doesn't  
11 have a Bates number on the Internet, at  
12 least not yet.

13 MR. DAVENPORT: That would be a  
14 neat trick. That would be an odd  
15 situation if it did, but okay.

16 BY MS. WOOLSON:

17 Q. So Exhibit 18 is an article --  
18 sorry -- is a study by Sean Vorce, Justin  
19 Holler, Brian Cawrse, C-A-W-R-S-E, and Joseph  
20 Magluilo, M-A-G-L-U-I-L-O --

21 A. Yes.

22 Q. -- Junior. And it was done for,  
23 looks like Department of Defense; correct?

24 A. Yes.

25 Q. Okay. And you would agree with me

1 I. Khan

2 that in this study Vorce and his colleagues are  
3 reporting that DMAA eluted with a solvent peak  
4 and so they initially missed detecting it;  
5 correct? I'm at the top of page 187 if that's  
6 helpful for you.

7 A. Well, yes, this is coming with the  
8 solvent peak. Anytime you analyze something,  
9 you have a buffer and solvent peak, so it's  
10 eluting at that point. That -- that had been  
11 raised in several publication, that DMAA should  
12 be coming in the beginning, not end where the  
13 Ping/Li reported, because they are light and  
14 volatile compound

15 THE REPORTER: They are light and?

16 THE WITNESS: Volatile.

17 THE REPORTER: Volatile? Thank  
18 you.

19 Q. And so if it co-elutes with solvent,  
20 it's possible that it's not being detected even  
21 if it's there; correct?

22 A. That -- it all depends on your  
23 method. If -- if you have starting with  
24 nothing, you generally screen everything what  
25 is in the -- the chromatogram. But if you are

1 I. Khan

2 not targeting it, yes, you can elute, co-elute  
3 with the solvent. And that's what happened.  
4 With LC, you retain [unintelligible] component  
5 with --

6 THE REPORTER: I'm sorry. With LC,  
7 you?

8 THE WITNESS: Retain a lot of  
9 component which is not eluted unless you  
10 wash the column. In GC it can come up  
11 front in the chromatogram with the  
12 solvent.

13 (Khan Exhibit No. 19 was marked for  
14 identification.)

15 THE WITNESS: Looks different.

16 BY MS. WOOLSON:

17 Q. I have the Chinese version as well  
18 but I didn't think that would be as useful to  
19 us. If somebody can read Chinese, I'm happy to  
20 mark it.

21 A. Somebody did read Chinese in order to  
22 confirm that they have DMAA.

23 Q. Well, that's not my point. My point  
24 is I have the Chinese version. Unless we can  
25 read Chinese, I don't think that's going to

1 I. Khan

2 help us.

3 A. If you talk about chromatogram, it  
4 might be useful in this one. But it depends on  
5 the question, so --

6 MS. WOOLSON: That's okay. I'll  
7 look to see if there's a chromatogram.  
8 You keep reading.

9 (Khan Exhibit No. 20 was marked for  
10 identification.)

11 MR. DAVENPORT: The one written in  
12 Chinese is Exhibit 20?

13 MS. WOOLSON: 20.

14 MR. DAVENPORT: Okay. Your Exhibit  
15 GOV-004569 looks very different than  
16 mine.

17 MS. WOOLSON: With the same numbers  
18 on it?

19 THE WITNESS: That's Chinese.

20 MR. DAVENPORT: Yes. It's the same  
21 document but you have a black line going  
22 through the chromatograph, I'm assuming,  
23 and the top.

24 MS. WOOLSON: Uh-huh.

25 MR. DAVENPORT: Can we go off the

1 I. Khan

2 record for a second?

3 (Discussion held off the record.)

4 BY MS. WOOLSON:

5 Q. So I'm showing you Exhibit 19 and  
6 Exhibit 20. I believe Exhibit 19 is the  
7 translation from Chinese of Exhibit 20 of the  
8 Ping paper that is cited in your report.

9 A. Yes.

10 Q. Okay. Now, in your report you  
11 discuss the fact that Ping matched spectra to a  
12 library of spectra. How did Ping go about  
13 doing that?

14 A. No idea. Probably --

15 Q. Okay. Well, in paragraph 20 of your  
16 report, which is Exhibit 1, I believe.

17 A. Yeah.

18 Q. Paragraph 20 on page 10. You say:  
19 "The conclusions" -- I'll wait until you get  
20 there. Sorry.

21 A. Yeah.

22 Q. You say: "The conclusions of the  
23 study were based on matching a peak spectrum of  
24 geranium oil with a library mass spectrum of  
25 DMAA." Right?

1 I. Khan

2 A. That's what we can guess.

3 Q. Then you say: "Most of the essential  
4 oils, however, contain several components and  
5 identification based solely on comparison of  
6 the spectra with the databases Wiley and NIST  
7 using a probability-based matching algorithms  
8 may lead to wrong structure or identification."

9 A. That's -- that's a fact.

10 Q. Okay. But as you sit here today, you  
11 can't say definitively that Ping made a mistake  
12 in his matching; correct?

13 A. Okay. Look at the Ping list, okay?  
14 And look at the chromatogram in the Ping  
15 method. We see, between 27 and 31, how many  
16 peaks we see?

17 Q. Uh-huh.

18 A. Only one. How many components here  
19 identified in the list? Four.

20 Q. I'm sorry, I'm not following you.

21 A. So if you see the chromatogram --

22 Q. Uh-huh.

23 A. -- it has 27 and 31. The other side.

24 Q. Oh, down here at this end? 27 and

25 31 --

1 I. Khan

2 A. Even --

3 Q. -- at the right-hand side --

4 A. Even --

5 Q. -- of the spectrum?

6 A. And even though the peaks are not  
7 known, how many peaks are there? Only one.

8 Q. Well, actually, I see one at 27, one  
9 between 27 and 31, one at 31.

10 A. If you look at the compounds, 27, 28,  
11 29, 30, 31.

12 Q. So it's your conclusion -- your  
13 contention that based on that, Ping has made a  
14 mistake in matching the spectra?

15 A. The -- the paper is -- something  
16 is -- take the word from what Fleming says  
17 about this paper and to what Li says. Forget  
18 about what other people, because other people  
19 did not find, so they have no validity. But  
20 those people who found it, what they are  
21 saying, that both have agreed, in fact, the --

22 THE REPORTER: I'm sorry, both  
23 have?

24 THE WITNESS: Agreed that this  
25 paper is not something that can be taken



1 I. Khan  
 2 scientifically sound document.  
 3 Q. Okay. Well, you have --  
 4 A. If you just look at the chromatogram,  
 5 27, and look at the name --  
 6 Q. Uh-huh.  
 7 A. -- one for DMAA even is not mentioned  
 8 except in Chinese. English name is wrong for  
 9 1,3-DMAA. Okay? But at least the molecular  
 10 formula is 115. There is no mention, except it  
 11 says in Chinese 1,4-DMAA, but no matching  
 12 formula. It says 129 and wrong name. So  
 13 somebody read the Chinese name and believe,  
 14 even though it's -- the molecular weight is  
 15 wrong, chemical name is wrong, but 1,4-DMAA is  
 16 there.  
 17 Q. Well, 1,4-DMA isn't there.  
 18 A. It's not there.  
 19 Q. On that list. We're talking about  
 20 1,3-DMAA; correct?  
 21 A. Yeah, 1,4-DMAA is also reported in  
 22 Ping/Li; otherwise, nobody has ever reported  
 23 1,4.  
 24 Q. So Ping has found 1,3 and 1,4-DMAA?  
 25 A. If they -- that's -- if you believe

1 I. Khan  
 2 THE WITNESS: Are coming in the  
 3 end.  
 4 THE REPORTER: "Coming in the end"?  
 5 Thank you.  
 6 THE WITNESS: The end of the  
 7 chromatogram.  
 8 Q. And they are analyzing a complete  
 9 sample of oil; correct?  
 10 A. They just analyzing oil, so --  
 11 Q. Right.  
 12 A. -- they did not try to find in the  
 13 plant.  
 14 Q. So when one analyzes a complete  
 15 sample of oil, one is analyzing a very complex  
 16 molecule, correct, with a lot of components?  
 17 A. It's still a part of the geranium.  
 18 They're not two different samples. One is a  
 19 plant material; one is oil.  
 20 THE REPORTER: Oh, I'm sorry. One  
 21 is a?  
 22 THE WITNESS: Plant material, one  
 23 is oil.  
 24 THE REPORTER: A plant what?  
 25 THE WITNESS: Material.

1 I. Khan  
 2 in what is written in Chinese, not in English,  
 3 not by chemical formula.  
 4 Q. Understood. And you don't speak  
 5 Chinese, and you don't read Chinese; correct?  
 6 A. But I can read the chemical name, and  
 7 I can read the -- the molecular weight, which  
 8 does -- does not match when you refer to  
 9 1,4-DMAA.  
 10 Q. And did you look up the spectrum of  
 11 1,4-DMAA and compare it to this chromatograph  
 12 that Ping published in his paper?  
 13 A. Nobody can reproduce it because  
 14 the -- the previous one, this one that you  
 15 have, Exhibit 18, okay, you say this paper  
 16 eluted at the 50-degree temperature right there  
 17 with the solvent system, that's right? That's  
 18 we just talk about.  
 19 Q. Yeah. So what does that have to do  
 20 with reproducing Ping?  
 21 A. Just look at the Ping paper. They  
 22 use 50-degree temperature in English  
 23 translation and their components coming in the  
 24 end.  
 25 THE REPORTER: "Their components"?

1 I. Khan  
 2 THE REPORTER: Material? One is  
 3 oil. Thank you.  
 4 Q. I -- I understand that. But my  
 5 question to you was specific to the oils.  
 6 Geranium oil is a very complex substance that  
 7 contains many components; correct? We talked  
 8 about this this morning, you told me there were  
 9 at least 90 components to geranium oil.  
 10 A. Yeah.  
 11 Q. Okay. And if you overload a column  
 12 with geranium oil, what happens?  
 13 A. What happens?  
 14 Q. Uh-huh.  
 15 A. You will not be getting a decent  
 16 chromatogram.  
 17 Q. And you can also have significant  
 18 matrix effects; correct?  
 19 A. Matrix effect in natural product is  
 20 always there, so --  
 21 Q. So I'll --  
 22 A. -- this is --  
 23 Q. -- take it --  
 24 A. -- why some --  
 25 Q. -- as a yes.

1 I. Khan

2 A. Matrix effect is always there. I  
3 don't know what -- see, when people analyze  
4 geranium plant, it was too much matrix and they  
5 should have found in the plant. Ping did not  
6 do it, but we believe in Ping study because he  
7 report it, listed it, okay? Ping did not  
8 confirm it. Ping did not identify it. Okay?  
9 Li study that went around the MRM to find it  
10 out. Ping did not do any of these thing. As  
11 you said, 1,4 were not there.

12 Q. But --

13 A. So the thing is, taking that study --

14 Q. Uh-huh.

15 A. -- and saying this is the study which  
16 has been criticized, both of the people who  
17 found it, and there are so many -- everybody in  
18 the literature, any -- anything you see, Ping  
19 study, it -- they didn't do anything.

20 They talk about the detection limit.  
21 It's .6 percent. Then they are criticizing  
22 people to have find 1 ppm like Lisi study. I  
23 mean, if it is of a level you come out they're  
24 talking about in the Ping/Li study, everybody  
25 in the world should have been able to find it.

1 I. Khan

2 Q. Where does Ping quantify the amount  
3 of DMA found?

4 A. .6 percent in the list. Here's the  
5 percentage.

6 Q. And -- and DMAA is where? Where are  
7 you? 29 and 30?

8 A. Yeah.

9 Q. So .23 and .65?

10 A. These are the different component,  
11 which nobody ever -- none of the people found  
12 this component.

13 Q. I -- I -- I understand you have --

14 A. Yeah, but --

15 Q. Sir?

16 A. -- these are the --

17 Q. Sir?

18 A. These are the --

19 MR. DAVENPORT: Hold on. Hold on.

20 Q. I understand you have a story you  
21 want to tell about Ping, but we're here today  
22 to take your deposition, which means I ask  
23 questions, you answer questions. You don't  
24 give a speech. Okay?

25 MR. DAVENPORT: Hold on. I think

1 I. Khan

2 he's trying to answer your question.  
3 Wait for the next question.

4 Q. So according to this list, the  
5 concentrations of 1,3-DMAA and 1,4-DMAA are .23  
6 and .66; correct?

7 A. .66 and .29.

8 Q. .66 and .29. Okay. And that's two  
9 out of 31 components, together they add up to  
10 less than 1 percent; correct?

11 A. Yes.

12 Q. Agree?

13 A. Yes.

14 Q. And just like you have supplemental  
15 material that's not in your articles, isn't it  
16 possible that Ping has supplemental material  
17 that's not in his article?

18 A. I cannot guess on it.

19 Q. In your report you also say that the  
20 Ping study does not describe the geographic  
21 location of the samples.

22 A. Yeah.

23 Q. Correct? Read paragraph 19 of your  
24 report.

25 A. Yes.

1 I. Khan

2 Q. So Ping did identify the geographic  
3 region for the samples, did he not?

4 A. That's where he was. They collected  
5 the sample, but that -- that's what --  
6 everybody provided information in that regard,  
7 the specific information for finding something  
8 which was not there but required more detail.

9 Q. Okay. Well, requiring more detail  
10 and saying someone hasn't done something are  
11 two different things; correct?

12 A. It -- it all depend on what --  
13 what -- what is asked for.

14 Q. Well, this was your report and your  
15 report said Ping didn't identify the geographic  
16 location of the samples, but in the immediate  
17 preceding paragraph you say that he did.

18 A. Yeah, I mean, that's very obvious  
19 that he was in China and going -- and more than  
20 that, I mean, it would have been -- provide a  
21 little bit more information would have been  
22 helpful for everybody.

23 Q. Well, we looked at a number of these  
24 reports that you're relying upon, and most of  
25 those just identify a generic region of the

1 I. Khan  
 2 country or a country where the samples come  
 3 from; correct?  
 4 A. A short answer, but yes.  
 5 Q. Let's go to paragraph 24 of your  
 6 report.  
 7 A. Yeah.  
 8 Q. In this paragraph you criticize the  
 9 Ping study because it -- it detected a  
 10 significant number of other amines in the  
 11 geranium oil?  
 12 A. Yeah.  
 13 Q. And why are you criticizing Ping  
 14 because of that?  
 15 A. The Ping study, whatever has been  
 16 written in this one, all the main components.  
 17 In geranium, for any analysis, before and  
 18 after, regardless of DMAA, nobody found amine  
 19 compound except Ping/Li. The question, if --  
 20 if it is reproducible, is found, it should have  
 21 been detected by someone, somewhere.  
 22 Q. And when you're saying no one has  
 23 ever detected any other amine compounds, didn't  
 24 Fleming detect 1,4-DMAA?  
 25 A. Other than these two, 1,4 we're

1 I. Khan  
 2 talking about. In this paragraph, you're  
 3 talking about everything else.  
 4 Q. Okay. But 1,4-DMAA is an amine;  
 5 correct?  
 6 A. Yeah.  
 7 Q. Okay.  
 8 A. But which you already mentioned is  
 9 not there in that paper.  
 10 Q. Now, you also criticized Ping for  
 11 finding very high levels of DMAA, much higher  
 12 than Li and Fleming; correct?  
 13 A. That's what reported, yeah.  
 14 Q. And the Ping paper was, what, 2006?  
 15 A. Ping? '96.  
 16 Q. 1996, excuse me.  
 17 A. Yeah.  
 18 Q. And the Li paper was when?  
 19 A. 2012, I believe.  
 20 Q. The Fleming paper was after that?  
 21 A. Almost same, same time, yes, 2012.  
 22 Q. And methods and detections have  
 23 changed and improved since 1996 to the present;  
 24 correct?  
 25 A. That's right.

1 I. Khan  
 2 Q. And again, Ping wasn't specifically  
 3 looking for DMAA in his study, was he?  
 4 A. Can't speak for that.  
 5 Q. Well, you've read the study, haven't  
 6 you?  
 7 A. Yeah. He did not mention in the  
 8 paper. It is -- he's not looking for DMAA;  
 9 he's analyzing geranium sample that has been --  
 10 THE REPORTER: He's analyzing?  
 11 THE WITNESS: Geranium samples  
 12 which has been analyzed by many other  
 13 investigators.  
 14 (Khan Exhibit No. 21 was marked for  
 15 identification.)  
 16 BY MS. WOOLSON:  
 17 Q. Exhibit 21 is the Li study that's  
 18 cited in your expert report; is that correct?  
 19 A. Yes.  
 20 Q. Okay. Now, the Journal of Analytical  
 21 Chemistry Insights, is that a peer-reviewed  
 22 journal?  
 23 A. I would believe so.  
 24 Q. And what is your definition of a  
 25 peer-reviewed journal?

1 I. Khan  
 2 A. Generally, they are citation indexed.  
 3 They are called scientific citation index.  
 4 They -- they are listed there. Some of the  
 5 paper are online publication which are becoming  
 6 very common nowadays. They might have their  
 7 own review process, but we can talk about it,  
 8 what it is.  
 9 Q. So you don't know what the review  
 10 process is; is that --  
 11 A. It's --  
 12 Q. -- correct?  
 13 A. It's -- yeah.  
 14 Q. Okay. Do you know who anyone on the  
 15 editorial board at Analytical Chemistry  
 16 Insights is?  
 17 A. No.  
 18 Q. If I told you that they were all  
 19 Ph.D. scientists with Ph.D.s in biology or  
 20 chemistry, would you be surprised by that?  
 21 A. No, not at all. Nowadays, there are  
 22 many, many online publications coming up. So  
 23 no, that does not surprise me. Only thing is  
 24 you have to pay a lot of amount to get it  
 25 published in the paper. So that's only thing I

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1 I. Khan  
2 know.  
3 Q. And do you know for a fact that  
4 Professor Li or Dr. Li had to pay to publish in  
5 Analytical Chemistry Insights?  
6 A. Unless they gave some kind of a  
7 waiver, I think that there is a fee for  
8 publication.  
9 THE REPORTER: Gave some kind of a?  
10 THE WITNESS: Waiver.  
11 MR. DAVENPORT: Waiver.  
12 Q. And so because there's a fee for  
13 publication, in your mind the articles that are  
14 published are less -- what's the word I want --  
15 scientifically sound?  
16 A. So generally -- the main factor is a  
17 citation index. Okay? So that's one thing.  
18 Other thing is you have publication that we  
19 don't know what the development process are,  
20 how stringent their review process is and how  
21 they select the paper, but --  
22 Q. So you don't know what the review  
23 process is?  
24 A. I don't want to comment on it, yes.  
25 Q. Okay. And what's the review process

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1 I. Khan  
2 THE WITNESS: Authenticated.  
3 THE REPORTER: Thank you.  
4 Q. In fact, if you look at page 48 of  
5 the report, which is the second page, the  
6 bottom right-hand corner it discusses the  
7 authentication of the plants and the oils;  
8 correct?  
9 A. Yeah.  
10 Q. Now, in your expert report you  
11 purport to criticize the Li report because it  
12 found considerably lower concentrations than  
13 those reported by Ping; correct?  
14 A. Let's look.  
15 Q. Paragraph 41 of your report.  
16 A. Yes.  
17 Q. Okay. And why is that, since you  
18 criticized the concentrations that Ping found?  
19 A. We have to start from somewhere. If  
20 Ping was right, they found a low concentration,  
21 and if you read the paper from the beginning --  
22 I'm not giving a lecture --  
23 THE REPORTER: I'm sorry. The  
24 paper from?  
25 THE WITNESS: If you read the paper

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1 I. Khan  
2 for drug test analysis?  
3 A. They send it to three reviewers, or  
4 at least two reviewers, get independent reports  
5 from the expert in the field, and the editor  
6 does their own judgment.  
7 Q. You mean the editorial board does its  
8 own judgment?  
9 A. Yeah, chief editor does look at  
10 the -- I don't know how to say the -- whether  
11 these people have been commenting based on  
12 science or based on judgment, whatever. So  
13 then the editor will communicate with the  
14 author.  
15 Q. Do you know who any of the people who  
16 reviewed your articles are?  
17 A. No.  
18 Q. Okay. Were the samples that Dr. Li  
19 used authenticated?  
20 A. Based on the information that's  
21 provided that they got the sample from China,  
22 it's the same person from three different  
23 regions. Based on their information, I assume  
24 that they were authenticated.  
25 THE REPORTER: That they were?

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1 I. Khan  
2 in the beginning they said that Ping has  
3 identified, so they are starting their  
4 finding based on Ping Li. But if you go  
5 back and compare it, Ping Li found  
6 higher amount.  
7 Q. Okay. And again, as we discussed a  
8 few minutes ago, the purpose of the Ping paper  
9 was not specific to detecting or quantifying  
10 DMAA; correct?  
11 A. Yes.  
12 Q. Okay. And the purpose of the Li  
13 paper was specific to detecting and attempting  
14 to quantify DMAA; correct?  
15 A. Quantifying DMAA, yes.  
16 Q. And it did so -- it used a different  
17 methodology than Ping did; correct?  
18 A. Yes.  
19 Q. And in your report you say: "When  
20 there are unprecedented findings of this  
21 nature, a more in-depth scientific study and  
22 application of additional scientific tools are  
23 usually required to confirm the accuracy of the  
24 findings, which were not done."  
25 A. Yes.

<p style="text-align: right;">Page 202</p> <p>1 I. Khan 2 Q. Do you see that? 3 A. Yes. 4 Q. So is it your testimony that Dr. Li 5 should have done additional studies as part of 6 this report -- 7 A. Right. 8 Q. -- to confirm his detection? 9 A. So you used the right term. This is 10 a report. Li paper is a technical report. 11 Sample were sent by a company for -- to a 12 contractual lab to analyze the sample. Is not 13 about finding DMAA or not. If -- they already 14 know the DMAA is there, they just only wanted 15 to make sure it's natural or not. Can you 16 analyze our sample? 17 So for the fee, there's a difference 18 between research and analyzing somebody's 19 sample. So Li finding, the method Li used, 20 it -- there no question but they use a sample 21 which was provided for service. Sample came to 22 them. If they did find something unusual, then 23 we should have confirmed with more test. 24 Q. Okay. 25 A. That's what it means.</p>	<p style="text-align: right;">Page 203</p> <p>1 I. Khan 2 Q. Let me stop you right there. Your 3 first paper regarding DMAA involved your lab 4 analyzing samples that were sent to you by the 5 U.S. Doping Agency; correct? 6 A. Product. 7 Q. Product? Fine. Product. That's 8 what you did as part of your first study; 9 correct? 10 A. No, not all of it. Part of it. 11 Q. I understand. Part of it. 12 A. Yeah. 13 Q. Okay. And in the Li paper, Li is 14 talking about actually testing plants not 15 products. 16 A. Yeah. 17 Q. Okay. So that's the same thing; 18 right? 19 A. The only difference is Li's finding, 20 then they have to confirm it. 21 Q. We will get to the confirmation. 22 It's just a question of you seem to be trying 23 to cast aspersions upon what Li did because he 24 supposedly analyzed a sample that someone sent 25 to him.</p>
<p style="text-align: right;">Page 204</p> <p>1 I. Khan 2 A. That's what it is. 3 MR. DAVENPORT: Objection. There's 4 no question pending. 5 Q. Now, earlier today you said that Li 6 confirmed that racemic mixtures cannot possibly 7 exist in nature. Do you recall that testimony? 8 A. Yes. 9 Q. So I'm going to have you go to page 10 56 of the Li report, and paragraph on the 11 right-hand side that starts with "The results." 12 You can read that to yourself and then I'll ask 13 you some questions. 14 A. Yes. 15 Q. So Li doesn't say that the racemic 16 mixture could not possibly be natural, does he? 17 A. Therefore, most likely only one 18 enzymatic process -- "most likely only one 19 chiral configuration would be present in a 20 plant." 21 Q. And what's the next sentence say? 22 A. "Often referred to as natural form." 23 Q. The next sentence? 24 A. This -- "The results in the current 25 study show that 1,3-DMAA in geranium plants and</p>	<p style="text-align: right;">Page 205</p> <p>1 I. Khan 2 geranium oil appears to be exception to the 3 notion." 4 Q. And what's the sentence after that 5 say? 6 A. "Indeed, this is not the first report 7 demonstrating the presence of a racemate in a 8 plant tissue. In fact, it's -- the presence of 9 a racemate (nerol oxide) has been demonstrated 10 once before in the geranium plant as well. 11 Further study is needed to elucidate the 12 biosynthetic pathway of DMAA in geranium 13 plant." 14 Q. Right. So Li didn't conclude that 15 the racemic mixture was incapable of being -- 16 A. Li -- 17 Q. -- naturally created, did he? 18 A. Li also missing the point. Nerol 19 oxide is not a biosynthetic; is a cyclization, 20 which is a chemical reaction. Sorry to give 21 you lecture, but -- 22 Q. I -- I understand you disagree with 23 that conclusion. But that is what Dr. Li 24 stated; correct? 25 A. Yeah, but this is what he said. It's</p>

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1 I. Khan  
 2 a exception to the notion.  
 3 Q. Uh-huh.  
 4 A. That's what he's saying.  
 5 Q. Right.  
 6 A. So that's what he said. He's  
 7 agreeing with. He didn't say you would find  
 8 the mixture. And we already discuss the  
 9 racemization. Biosynthetic pathway, making a  
 10 component racemization are two different  
 11 things.  
 12 Q. Yes, but Dr. Li said, based on his  
 13 findings, it appears that the 1,3-DMAA in the  
 14 plants and oil is an exception to this notion  
 15 that you cannot have a racemic mixture;  
 16 correct?  
 17 A. Yes.  
 18 Q. Thank you.  
 19 (Discussion held off the record.)  
 20 (Khan Exhibit No. 22 was marked for  
 21 identification.)  
 22 BY MS. WOOLSON:  
 23 Q. So Exhibit 22 is the Fleming report;  
 24 correct?  
 25 A. Yes.

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1 I. Khan  
 2 A. I think I'm missing a page here.  
 3 Yeah.  
 4 MR. DAVENPORT: He has the -- every  
 5 other page.  
 6 MS. WOOLSON: Okay. Let me see if  
 7 this one's got every page.  
 8 MR. DAVENPORT: The one I have --  
 9 MS. WOOLSON: This one's got every  
 10 other page too.  
 11 MS. JAMPOL: Okay, here's one.  
 12 MS. WOOLSON: Is there something  
 13 stuck behind it?  
 14 MR. DAVENPORT: The last page is  
 15 78?  
 16 MS. WOOLSON: Yeah, 78.  
 17 MR. DAVENPORT: Before we go  
 18 forward, why don't we have this one then  
 19 be the official one?  
 20 MS. WOOLSON: Yeah.  
 21 BY MS. WOOLSON:  
 22 Q. So this identifies four samples;  
 23 correct?  
 24 A. Yes.  
 25 Q. Okay. And if you look at the

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1 I. Khan  
 2 Q. That's what's referred to in your  
 3 expert report?  
 4 A. Yes.  
 5 Q. Okay. And did Fleming detect DMAA --  
 6 A. Yes.  
 7 Q. -- in plant samples?  
 8 A. Yes.  
 9 Q. And where were the plant samples  
 10 sourced from?  
 11 A. He detect only one out of three  
 12 samples.  
 13 Q. And where was that sample sourced  
 14 from?  
 15 A. I believe it came from the same  
 16 location based on the information provided as  
 17 in the Li paper.  
 18 Q. In fact, it was actually the sample  
 19 that Li examined; correct?  
 20 A. One of the sample was -- came from  
 21 Li. Three samples came from the same location,  
 22 I believe.  
 23 Q. Okay. And if you look at table 3 of  
 24 the report, which is on page 66, it lists four  
 25 samples; correct?

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1 I. Khan  
 2 conclusion which is on page 70 and 71, it  
 3 discusses finding 1,3-DMAA in the sample S11;  
 4 correct?  
 5 A. Yeah.  
 6 Q. And that's the sample from Li?  
 7 A. That's -- I assume that's sample --  
 8 Q. Okay.  
 9 A. -- from Li.  
 10 Q. Now, when you did your studies on  
 11 DMAA, did you ask Dr. Li for a sample of the  
 12 products that he had used?  
 13 A. No.  
 14 Q. And I take it you never asked  
 15 Dr. Simone for a sample of the product that his  
 16 laboratory used.  
 17 A. No.  
 18 Q. Now, your report does not criticize  
 19 the analytical methods used by Dr. Fleming or  
 20 Dr. Li, does it?  
 21 A. Dr. Fleming I -- I -- I do have  
 22 concern about these studies because these are  
 23 the only two studies with finding it. But the  
 24 variability presented in Fleming paper, it  
 25 creates more confusion.

1 I. Khan

2 Q. My question was, in your report did  
3 you criticize the analytical techniques used by  
4 Dr. Fleming?

5 A. Yes. We talked about different  
6 concentration in number 45.

7 Q. So that is a criticism of the result  
8 of the study, not the method that's used;  
9 correct?

10 A. Yes.

11 Q. You would agree with me that the  
12 Fleming study was conducted according to U.S.  
13 Pharmacopeia guidelines?

14 A. No. EPA guidelines.

15 Q. EPA guidelines?

16 A. Fleming study, yes.

17 Q. Okay. So you think that the Fleming  
18 study is done by EPA guidelines?

19 A. I -- I think that's what -- Li study  
20 was done USP, but I think he talked about EPA  
21 and that's what it says in the table, I think.  
22 Yeah, US EPA MDL.

23 Q. And what are you looking at?

24 A. This is table 2, USP.

25 Q. Table 2?

1 I. Khan

2 A. Primary -- it's the EPA.

3 Q. Those are just the MDLs; right?

4 A. According to EPA.

5 Q. Right.

6 A. Yeah.

7 Q. Those were used to determine the  
8 detection limits, accuracy and precision of the  
9 studies; correct?

10 A. Of the method.

11 Q. Right. But you said the Li study was  
12 done pursuant to U.S. Pharmacopeia guidelines;  
13 correct?

14 A. That's what it says, yes.

15 Q. So both Li and Fleming detected  
16 1,3-DMAA in the same sample; correct?

17 A. Different concentration, yes.

18 Q. I understand there's a different  
19 concentration, but they both detected it;  
20 correct?

21 A. I just want to be clear.

22 Q. They both detected it; correct?

23 A. Yeah.

24 Q. Okay.

25 A. Only in one sample.

1 I. Khan

2 Q. And were the concentrations that  
3 Fleming detected higher or lower than the  
4 concentrations that Li detected? It's in  
5 paragraph 45 of your report. I'm -- I'm not --

6 A. It is, but the Changzhou, which is --  
7 so you're talking about the same sample?

8 Q. Yes, the S11 sample.

9 A. Yeah, S11 sample, it was reported  
10 165, if I'm not mistaken, in Li. And in this  
11 Fleming study is giving a different  
12 concentrations.

13 Q. And they gave -- they gave 97 -- 499  
14 in Changzhou S11 and they found 97 nanograms  
15 per gram in Changzhou 3; correct?

16 A. Yeah.

17 Q. Okay. And Li detected 365 -- oh,  
18 wait. I'm sorry.

19 A. No, that's from different sample,  
20 from Guizhou sample.

21 Q. Yeah, I'm sorry, I've got -- I've got  
22 it --

23 A. Yeah.

24 Q. Got it wrong.

25 A. Yeah.

1 I. Khan

2 Q. In any event, your criticism of the  
3 Fleming study is that it came up with a  
4 different concentration of DMAA than the Li  
5 study; correct?

6 A. Yes.

7 Q. Now, the Fleming study, did that have  
8 any different steps or additional steps that it  
9 performed or used in terms of preparing the  
10 samples different from the Li study?

11 A. Yeah. He uses a addition method, so  
12 table 3 is based on analysis set 1. Table 4  
13 and 5 is based on analysis 2, set 2, but the  
14 sample in table 4 and table 5 are different.  
15 One is winter; one in summer.

16 Q. And what is your understanding of  
17 what the standard addition method is?

18 A. Is just a standard addition method is  
19 to add -- do the additional calculation to come  
20 up with the probable values.

21 THE REPORTER: The probable?

22 THE WITNESS: Probable values.

23 THE REPORTER: Values? Thank you.

24 Q. So the standard addition method is to  
25 help detection and quantification?

1 I. Khan  
 2 A. Yes.  
 3 Q. Did the Fleming study do any  
 4 additional extraction procedures different from  
 5 the Li paper?  
 6 A. Honestly speaking, it is very  
 7 confusing because he has changed his procedure.  
 8 In table 3 is different than table 4, and table  
 9 5 is different sample. So he said, according  
 10 to this paper, it used limited but is improved,  
 11 and that's what it says.  
 12 Q. Okay. And what was the improvement?  
 13 A. He uses the addition method.  
 14 Q. Did he also do an additional hexane  
 15 extraction?  
 16 A. For the table 4?  
 17 Q. I'm asking in the paper generally not  
 18 specific to any particular table.  
 19 A. He did differently. I can't -- yeah,  
 20 he probably used hexane. I have to --  
 21 Q. Okay. I'll refer you to page 27872.  
 22 A. 27872? Yes, he used a hexane  
 23 partition step.  
 24 Q. Okay. And we've talked about a  
 25 number of methods that your laboratory used

1 I. Khan  
 2 and -- including, for example, GC mass spec, LC  
 3 mass spec/mass spec. Each of those types of  
 4 analysis, the LC, the GC, the mass spec, they  
 5 are all different and independent methods of  
 6 analysis; correct?  
 7 A. That's right.  
 8 Q. So the Fleming analysis and HP mass  
 9 spec/mass spec, those are two different types  
 10 of analysis; correct?  
 11 A. Yes.  
 12 Q. And the Li analysis, what did Li do  
 13 in -- in terms of the methodology? Do you  
 14 know -- recall?  
 15 A. No.  
 16 Q. You can look at Exhibit 21 if you  
 17 need to. Probably page 49 maybe might help.  
 18 A. Yeah. You mean he was using the .5  
 19 hydrochloride?  
 20 Q. No, he was using liquid  
 21 chromatography, mass spectrom- -- the LC/MS/MS  
 22 method.  
 23 A. Oh. So talking about condition.  
 24 Q. Yeah, just the -- the methodology  
 25 that was used, that's all.

1 I. Khan  
 2 A. Yeah.  
 3 Q. And -- and the LC is a separate and  
 4 independent method of detection than the mass  
 5 spec; correct?  
 6 A. Mass spec is used as a detector with  
 7 LC, yes.  
 8 Q. My question was they are two  
 9 different and independent methods of detection;  
 10 correct?  
 11 A. Both are LC/MS/MS methods.  
 12 Q. Okay. Maybe I'm not being clear, but  
 13 the LC method is a separate and independent  
 14 method from the mass spec method. That's all  
 15 I'm asking you.  
 16 A. Yes, for --  
 17 Q. Okay. And stay with Li for a second.  
 18 And Li used two transitions, two ion  
 19 transitions with mass spec? That's also on  
 20 page 49 at the bottom.  
 21 A. Page 49.  
 22 Q. I'm sorry, I know I have you jumping  
 23 back and forth.  
 24 A. Yeah.  
 25 Q. Okay.

1 I. Khan  
 2 (Khan Exhibit No. 23 was marked for  
 3 identification.)  
 4 BY MS. WOOLSON:  
 5 Q. So this is your rebuttal report,  
 6 which we've marked as Exhibit 23.  
 7 A. Yes.  
 8 Q. Take a second to review it. First of  
 9 all, in your report you say that you have  
 10 reviewed the declarations of Marvin Heuer,  
 11 H-E-U-E-R, and Dr. Simone.  
 12 A. Yes.  
 13 Q. Your rebuttal report then does not  
 14 mention Dr. Heuer again; is that correct?  
 15 A. Yes.  
 16 Q. Okay. And why is that?  
 17 A. Except mentioning in very general  
 18 about DMAA, Ping study, but he goes into the  
 19 safety part, which is not my area of -- my  
 20 charge.  
 21 Q. So you're really not rebutting any of  
 22 the assertions made by Dr. Heuer?  
 23 A. Except occasionally he said that Ping  
 24 found it's a study that --  
 25 Q. Okay.



1 I. Khan  
 2 A. Yeah.  
 3 Q. But you're not offering any opinion  
 4 on the safety of DMAA?  
 5 A. I'm not.  
 6 Q. Okay. Now, in your rebuttal report,  
 7 you say that Dr. Simone failed to provide the  
 8 concentration found for the split sample that  
 9 he and the Li group tested. Isn't that  
 10 information in the Fleming report? The Fleming  
 11 study that we marked as Exhibit 22?  
 12 A. Sample number are not matching, are  
 13 not clearly identified, but if you assume it  
 14 here, numbers are there, but which number is  
 15 which?  
 16 Q. Well, if you look at the conclusion  
 17 of Dr. Fleming in Dr. Simone's report, which is  
 18 on page 71 of Exhibit 22, at the top of that  
 19 page.  
 20 A. Page 71?  
 21 Q. Yeah.  
 22 A. On the top?  
 23 Q. Yeah. It says: "Reported  
 24 concentrations of 1,3-DMAA range from 68 to  
 25 496 nanograms per gram"?

1 I. Khan  
 2 finding DMAA in geranium plants; correct?  
 3 A. In one sample.  
 4 Q. Okay. And in paragraph 3 you  
 5 criticize Dr. Fleming and Dr. Li's reports  
 6 because they only tested a small number of  
 7 samples; correct?  
 8 A. Yes.  
 9 Q. But they are the only sample -- the  
 10 only studies that tested the same samples and  
 11 made sure that they were testing samples from  
 12 the Guangzhou -- I'm going to mispronounce that  
 13 at this point in the day -- but the Guangzhou  
 14 region from China; correct?  
 15 A. Guangzhou region?  
 16 Q. Yes, Guangzhou region. Thank you.  
 17 In paragraph 4, you're talking about  
 18 the use of ions to assist in identification.  
 19 You would agree with me that there's two parts  
 20 to using an ion to detect. One is the presence  
 21 of it, but the second part is also the  
 22 abundance of the ion?  
 23 A. First is it present, then you look at  
 24 the ratio for abundance, yes.  
 25 Q. Okay.

1 I. Khan  
 2 Do you see that?  
 3 A. Yes.  
 4 Q. Okay.  
 5 A. So we -- we cited a number, but we  
 6 still aren't sure where it is coming from.  
 7 Q. What do you mean, you're not sure  
 8 where it comes from?  
 9 A. No explanation is offered. Like 496  
 10 is not listed in any of the table.  
 11 Q. Okay, but --  
 12 A. Yeah, it's --  
 13 Q. -- instead --  
 14 A. Yeah, number is there, it's just --  
 15 Q. Fine.  
 16 A. -- we don't know how he came up with  
 17 it.  
 18 Q. Okay. And then the next part of your  
 19 rebuttal is again bringing up the fact that the  
 20 Li and Fleming studies had different  
 21 concentrations; correct?  
 22 A. Yes.  
 23 Q. Okay. Leaving aside the fact that  
 24 they had different concentrations, you would  
 25 agree with me that both of the studies report

1 I. Khan  
 2 THE REPORTER: You look at the  
 3 ratio for?  
 4 THE WITNESS: Abundance.  
 5 THE REPORTER: Abundance.  
 6 Q. So there's two components to using an  
 7 ion for detection. It's not just 1, 2, 3; it's  
 8 I have this in this percentage abundance and  
 9 that percentage of abundance?  
 10 A. Linked with the retention time, yes.  
 11 Q. So depending on the circumstances,  
 12 you might have two very strong transition ions  
 13 and one weaker one and you may choose to only  
 14 look at the two that are stronger or more  
 15 abundant; correct?  
 16 A. You can choose -- so again, it all  
 17 depend what is your question. If you are  
 18 looking for identification, then not. But if  
 19 you know that the reference and retention time  
 20 is matching and you tentatively want to  
 21 describe what it is, yes, you can.  
 22 Q. Okay. So when you say the use of  
 23 three ions versus two ions results in a higher  
 24 degree of certainty, you're not suggesting that  
 25 the identification is completely flawed and

1 I. Khan  
2 should be thrown out if somebody only uses two  
3 ions; correct?  
4 A. Actually, the Li paper uses three  
5 ions.  
6 Q. Okay. That wasn't my question. My  
7 question was, when you're talking about the use  
8 of three ions versus two ions, you're not  
9 suggesting, are you, that if you use two ions,  
10 that some means -- somehow means that your  
11 identification isn't valid and should be  
12 rejected?  
13 A. It's not a confirmatory  
14 identification, but you can use it for the  
15 value it is.  
16 Q. And where would I go to look for a  
17 standard that says you have to use three ions  
18 to confirm an identity?  
19 A. No, you have to -- there is no  
20 minimum standard. In some of the analysis,  
21 people use more than three.  
22 Q. And presumably in some analysis they  
23 use less than three; correct?  
24 A. Less than three? Probably they can,  
25 but I'm not sure. But you have to have ratio

1 I. Khan  
2 A. Yeah.  
3 Q. You did not detect any DMAA; correct?  
4 A. We just quickly run it just because  
5 of the curiosity. Is it fertilizer, is it  
6 organic material? We did not -- so this is  
7 what it is.  
8 Q. Okay. And if we look at that  
9 certificate of analysis, which is 13255,  
10 hopefully.  
11 A. Yeah.  
12 Q. Okay. The -- do you have it? I  
13 think it's before.  
14 MR. DAVENPORT: 13 -- 31255?  
15 MS. WOOLSON: Yeah.  
16 MR. DAVENPORT: Okay.  
17 Q. The chart -- the table says UPLC/UV,  
18 which is what? Ultra performance liquid  
19 chromatography and UV?  
20 A. Yes.  
21 Q. Under "Analytical Conditions" it says  
22 HPLC-TOF-MS.  
23 A. We use both detectors, so it should  
24 be UV mass spec.  
25 Q. So it's not -- it's not the ultra

1 I. Khan  
2 of abundance. When three ions means two MRM  
3 and two MRM is looks like a normal practice  
4 where there's the Li, Fleming and other people,  
5 the Zhang paper, they all use the two MRM. And  
6 two MRM comes from three ions. Only in GC we  
7 don't have MRM, so we use three ions so  
8 actually the same thing.  
9 Q. So Fleming did do MRMs --  
10 A. Yes.  
11 Q. -- correct?  
12 Okay. And your lab used MRMs as well  
13 to confirm identity or the absence of identity?  
14 A. Yes.  
15 Q. Okay. Now, in paragraph 7 you talk  
16 about potential contamination from fertilizers;  
17 correct?  
18 A. Yeah, yes.  
19 Q. And do you have any evidence  
20 whatsoever to support the notion that the plant  
21 samples that were analyzed by Li or Fleming  
22 were contaminated by fertilizer?  
23 A. No.  
24 Q. And when you did your sample analysis  
25 of the fertilizer, Osmocote -- Osmocote?

1 I. Khan  
2 performance?  
3 A. No.  
4 Q. So this is a mistake?  
5 A. That's a mistake. It should be mass  
6 spec.  
7 Q. All right.  
8 A. Because we use both detectors.  
9 Q. Where did you source the Osmocote?  
10 A. I think we get it from Wal-Mart.  
11 Q. Wal-Mart. Okay.  
12 A. Again, I'm not 100 percent sure,  
13 but --  
14 MS. WOOLSON: All right. Let's  
15 see, why don't we go off the record for  
16 five minutes.  
17 (Discussion held off the record.)  
18 (Khan Exhibit No. 24 was marked for  
19 identification.)  
20 BY MS. WOOLSON:  
21 Q. We are talking about this one. And I  
22 will tell you that I'm only going to ask you a  
23 very few questions about the first page, but if  
24 you want to read the whole thing, you can read  
25 the whole thing.

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1 I. Khan  
 2 A. I can read it.  
 3 Yes.  
 4 Q. Dr. Khan, I'm showing you Exhibit 24,  
 5 which is an email exchange of several pages  
 6 long, but I really only want to ask you  
 7 questions about the first page. First of all,  
 8 have you seen this email exchange before?  
 9 A. Yes.  
 10 Q. Okay. And who is Mark Roman?  
 11 A. Mark Roman, sorry to inform, has  
 12 passed away, but he was active member and had  
 13 private lab for analysis.  
 14 Q. An active member of what?  
 15 A. AOAC.  
 16 Q. And what is that?  
 17 A. Organization of analytical chemists,  
 18 AOAC.  
 19 Q. And who is Mark Blumenthal?  
 20 A. Mark Blumenthal is the CEO and  
 21 founder of American Botanical Council.  
 22 Q. I think we talked about Joseph Betz  
 23 and John Cardellina this morning. Who is  
 24 anthony@imagnutrition.com, if you know?  
 25 A. I haven't -- I can't guess with the

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1 I. Khan  
 2 page. We were copied on it.  
 3 Q. And do you know why it was  
 4 distributed to everyone?  
 5 A. No. I mean, this is -- DMAA is a hot  
 6 topic. Everybody interested in the research,  
 7 and Jim Kababick commented on this paper which  
 8 was submitted to --  
 9 Q. Was this criticism ever published  
 10 anywhere to your knowledge?  
 11 A. You mean as a publication?  
 12 Q. Yeah. Or a letter to the editor or  
 13 anything like that?  
 14 A. No, I don't recall being published  
 15 his comments.  
 16 Q. Okay.  
 17 A. Yeah.  
 18 MS. WOOLSON: That's it. I have no  
 19 further questions. Thank you.  
 20 THE WITNESS: Thank you.  
 21 MR. DAVENPORT: We will read.  
 22  
 23 (Deposition adjourned at 4:51 p.m.)  
 24  
 25

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1 I. Khan  
 2 email.  
 3 Q. And John Kababick?  
 4 A. Jim Kababick has a private analytical  
 5 lab called -- I think it's Flora Research.  
 6 Q. Okay. And Daniel Armstrong?  
 7 A. Daniel Armstrong?  
 8 Q. If you know. If you don't, that's  
 9 okay.  
 10 A. No.  
 11 Q. And I think we also spoke about Frank  
 12 Jaksch earlier. He's the person at ChromaDex?  
 13 A. That's right.  
 14 Q. And all of you are members of the  
 15 AOAC; is that correct?  
 16 A. No, I don't think John Cardellina is  
 17 AOAC member. I mean, he might be member, but  
 18 not on the committee.  
 19 Q. And do you know -- I'm sorry. I  
 20 didn't mean to cut you off. Do you know how it  
 21 is that you all came to be in possession of  
 22 this email which purports to be Jim Kababick's  
 23 detailed comments to the Li paper?  
 24 A. Jim Kababick wrote it and probably  
 25 sent it to Mark. That's what it says on the

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1 I. Khan  
 2 C E R T I F I C A T E  
 3 D I S T R I C T O F C O L U M B I A :  
 4 I, MARY ANN PAYONK, shorthand reporter,  
 5 do hereby certify that the witness whose  
 6 deposition is hereinbefore set forth was duly  
 7 sworn, and that such deposition is a true,  
 8 correct, and full record of the testimony  
 9 given.  
 10 I further certify that I am not related  
 11 to any of the parties to this action by blood  
 12 or by marriage, and that I am in no way  
 13 interested in the outcome of this matter.  
 14 IN WITNESS WHEREOF, I have hereunto set  
 15 my hand this 31st day of October, 2016.  
 16  
 17 \_\_\_\_\_  
 18 MARY ANN PAYONK, Shorthand Reporter  
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1 I. Khan  
 2 - INDEX TO WITNESSES -  
 3 WITNESS PAGE  
 4 IKHLAS A. KHAN, Ph.D.  
 5 Examination by Ms. Woolson 4  
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 9 Exhibit No. 2 Email chain 50  
 10 Exhibit No. 3 Comparison of chemical and 56  
 11 stereochemical tests for the  
 12 identification and differentiation  
 13 of Pelargonium graveolens  
 14 Exhibit No. 4 Paper published by Mahmoud 67  
 15 ElSohly  
 16 Exhibit No. 5 Email chain between Dr. 87  
 17 ElSohly, Khan, Larry Bowers, and  
 18 Amy Eichner  
 19 Exhibit No. 6 Email string, Bowers to 102  
 20 Gul, ElSohly, Eichner  
 21 Exhibit No. 7 Multicenter study 113  
 22 Exhibit No. 8 Email chain 135  
 23 Exhibit No. 9 Email chain 141  
 24 Exhibit No. 10 DMAA study 151  
 25 Exhibit No. 11 DART Detection limit 158

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 5 Exhibit No. 13 Lisi study 162  
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 13 Exhibit No. 20 Document written in 182  
 14 Chinese  
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 16 Exhibit No. 22 Fleming report 206  
 17 Exhibit No. 23 Khan rebuttal report 217  
 18 Exhibit No. 24 Email chain 225  
 19  
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 22  
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 24  
 25

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1 I. Khan  
 2 NAME OF CASE: US vs. Hi-Tech, et al.  
 3 DATE OF DEPOSITION: October 26, 2016  
 4 1. To clarify the record.  
 5 2. To conform to the facts.  
 6 3. To correct transcription error.  
 7  
 8 Page \_\_\_\_\_ Line \_\_\_\_\_ Reason \_\_\_\_\_  
 9 From \_\_\_\_\_ to \_\_\_\_\_  
 10 Page \_\_\_\_\_ Line \_\_\_\_\_ Reason \_\_\_\_\_  
 11 From \_\_\_\_\_ to \_\_\_\_\_  
 12  
 13 Page \_\_\_\_\_ Line \_\_\_\_\_ Reason \_\_\_\_\_  
 14 From \_\_\_\_\_ to \_\_\_\_\_  
 15  
 16 Page \_\_\_\_\_ Line \_\_\_\_\_ Reason \_\_\_\_\_  
 17 From \_\_\_\_\_ to \_\_\_\_\_  
 18  
 19  
 20 \_\_\_\_\_  
 21 IKHLAS A. KHAN, Ph.D.  
 22 SUBSCRIBED AND SWORN TO BEFORE ME  
 23 THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 2016.  
 24 \_\_\_\_\_  
 25 (Notary Public)  
 My Commission expires: \_\_\_\_\_

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