MATERIALS RE: SYNTHETIC CATHINONES

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UNITED STATES DISTRICT COURT

EASTERN DISTRICT OF NEW YORK

UNITED STATES OF AMERICA, Plaintiff, v. CHIN CHONG, Defendant.	NO. CR 13-CR-570 (JBW) **DEFENDANT'S POSITION RE: APPLICATION OF SENTENCING GUIDELINES**

Defendant Ching Chong, by and through his attorney of record, Assistant Federal Defender Chase Scolnick, hereby submits his position regarding the application of the Sentencing Guidelines. Because this filing raises a number of complex issues that require extensive discussion and analysis, Mr. Chong will address the remaining 3553(a) factors in a separate brief.

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SENTENCING MEMORANDUM RE SENTENCING GUIDELINES

I.

INTRODUCTION

The government charged Mr. Chong in a four-count indictment with activities relating to the importation and distribution of methylone, and Mr. Chong proceeded to trial. At Mr. Chong's first trial, the jury hung 11-1 in favor of acquittal.[1] At the second trial, the jury largely rejected the government's case by acquitting him of the three counts relating to Mr. Chong's alleged importation of methylone. It convicted him of one count relating to distributing smaller amounts of methylone to his friends, often without payment, at local nightclubs and parties.

Mr. Chong now comes before this Court for sentencing on his sole count of conviction. He files this brief to address the complex and novel issues relating to the application of the sentencing guidelines.

In the first section of this brief, Mr. Chong raises multiple objections to the presentence report. Mr. Chong asserts that Probation erred in calculating his guidelines for at least three reasons. First, because Methylone is not covered by the sentencing guidelines, Mr. Chong's offense level is calculated by using the guidelines for the most analogous controlled substance. Probation asserts that MDMA is the most analogous substance and asks the Court to sentence Mr. Chong based on MDMA's 500:1 marijuana equivalency ratio. Mr. Chong objects to this finding and argues that cathinone, the active ingredient in Khat, is more closely related to Methylone for purposes of calculating his guidelines. To support this argument, Mr. Chong has attached declarations from Dr. Greg Dudley, Ph.D., a

[1] After the first mistrial in this case, this Court polled the jury regarding its deliberations.

professor of chemistry, and Dr. Anthony DeCaprio, Ph.d., a doctor of toxicology and professor of chemistry. When Mr. Chong's Guidelines are properly calculated, by comparing Methylone to Khat/Cathinone, the marijuana equivalency ratio is 10:1.

Mr. Chong also objects to Probation's calculation of the quantity of Methylone involved because it includes the 500 grams that were seized at the airport and charged in Counts One, Two, and Four. The jury acquitted Mr. Chong of the three counts relating to this transaction; it only convicted him of conspiring to possess with intent to distribute small quantities of Methylone to his friends at parties. Mr. Chong asserts that it would be fundamentally unfair, as well as a violation of his Fifth and Sixth Amendment rights, to sentence him based on acquitted conduct.

Finally, Mr. Chong objects to Probation's recommendation for an enhancement based on Mr. Chong's alleged aggravating role in the offense. This enhancement is inappropriate because it is based almost entirely on Mr. Chong's role in the importation of Methylone, for which he was acquitted by the jury. To the extent that the enhancement is based on Mr. Chong's distribution of small amounts of Methylone to his friends, his role was equal to codefendant Singh, who trafficked in drugs independently of Mr. Chong.

In the second section of this brief, Mr. Chong will make an alternative guidelines argument, should this Court reject his argument that Khat/Cathinone is a more appropriate drug of comparison for the purposes of calculating his base offense level. If this Court finds that MDMA is the appropriate drug of comparison when calculating Mr. Chong's guidelines, he urges this Court to exercise its discretion under *Kimbrough v. United States*, 552 U.S. 85 (2007), and its progeny to reject the 500:1 ratio set forth in the Ecstasy guidelines and replace it with a 50:1 ratio, which more accurately and fairly carries out the goals of punishment. As recently

determined by other district courts, the Ecstasy guidelines are largely based on now repudiated science and flawed analysis. *See, United States v. McCarthy*, 2011 WL 1991146, Case No. 09-cr-1136 (S.D.N.Y. May 19, 2011)(unpublished) (rejecting MDMA guidelines and substituting 200:1 ratio); *United States v. Qayyem*, 2012 WL 92287, Case No. 10-cr-19-KMW (S.D. N.Y. Jan. 11, 2012)(unpublished)(same).

In support of the request for the Court to exercise its "reject and replace" authority regarding the MDMA guidelines, the transcript of the two-day evidentiary hearing held in *McCarthy* and numerous scientific articles and secondary resources are attached as exhibits, as identified below. Support is also found in the declaration of Charles S. Grob, M.D., a psychiatrist specializing in medical and psychiatric research of MDMA and hallucinogens. (Exhibit A).[2]

After this Court determines the appropriate marijuana equivalency for MDMA, Mr. Chong requests that it then exercise its authority to apply a fair ratio for Methylone. Mr. Chong urges this Court to adopt a 10:1 marijuana equivalency ratio for methylone, which is based primarily on the neuro-toxicological comparison of methylone and MDMA performed by Anthony DiCaprio, Ph.D., DABT.[3] (Exhibit B). The declarations of chemist, Gregory Dudley, Ph.D. (Exhibit C); and Dr. Grob, M.D. (Exhibit A) also lend support for the 10:1 conclusion. The 10:1 ratio is derived from the scientific conclusion that methylone has one-fifth the potency of MDMA, and because Methylone also presents a less significant health risk.

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[2] Should the Court find it helpful to hold an evidentiary hearing to further inquire into the scientific evidence, the defense welcomes the opportunity to present expert testimony in further support of the *Kimbrough* challenge to the MDMA guidelines, as well as assigning the appropriate marijuana equivalency to methylone, given that it is a far less potent/dangerous drug than MDMA.

[3] "DABT" indicates that Dr. DeCaprio is has certification as a Diplomat by the American Board of Toxicology.

Assuming that the Court finds a substitute ratio of 50:1 is appropriate for MDMA, a one-fifth potency reduction results in a 10:1 ratio for methylone.

II.

OBJECTIONS TO THE PSR

A. Mr. Chong's Offense Level Should Be Based On Khat/Cathinone Because It Is More Closely Related To Methylone Than MDMA

Methylone is a newer drug that is not specifically referenced in the guidelines. Under these circumstances, the sentencing court must determine the base offense level using the marijuana equivalent of the "most closely related controlled substance referenced in the guideline." USSG 2D1.1, note 6.

The guidelines provide that, in order to determine the most closely related substance, the Court should consider the following factors: (A) Whether the controlled substance not referenced in this guideline has a chemical structure that is substantially similar to a controlled substance referenced in this guideline; (B) Whether the controlled substance not referenced in this guideline has a stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance referenced in this guideline; and (C) Whether a lesser or greater quantity of the controlled substance not referenced in this guideline is needed to produce a substantially similar effect on the central nervous system as a controlled substance referenced in this guideline. *Id.* While the sentencing court should consider all three of these factors, it should be noted that this comparison is far from an exact science. "[I]n some circumstances, sentencing courts will be unable to match substances under each of the factors." *United States v. Chowdury*, 639 F.3d 583, 586 (2d Cir. 2011).

Probation asserts that MDMA is the most closely related substance to Methylone, and it calculates Mr. Chong's guidelines based on MDMA's marijuana equivalency ratio, which is 500:1. PSR ¶¶ 4,10,15.

Mr. Chong objects to probations conclusion and argues that his base offense level should be determined by referencing Khat/Cathinone because that substance is more closely related to Methylone. Khat has a marijuana equivalency ratio of .01:1. USSG 2D1.1, note 8(D). Because khat plants contain, on average, about .1% by weight of Cathinone, he is requesting that this Court apply a marijuana equivalency ratio of 10:1. *See* Al Motarreb A, Baker K, Broadley KJ. Khat: pharmacological and medical aspects and its social use in Yemen. Phytother Res 2002;16:403-413.

As explained below, Mr. Chong's position is supported by the declarations of Drs. Anthony DeCaprio, and Gregory Dudley, as well as the data and research upon which they rely.

1. <u>The Chemical Structure Prong</u>

Beginning with the chemistry prong, Gregory Dudley, Ph.D. is an organic chemist and Associate Professor and Chair in the Department of Chemistry and Biochemistry at Florida State University. In his expert opinion, Methylone is more similar in chemical structure to Cathinone than it is to MDMA. This conclusion is based, in part, on the core structure of Methylone, which Dr Dudley describes as follows: "Structurally, Methylone is classified as a 'Cathinone' to indicate that Methylone includes the core structure of the substance found naturally in the Khat plant, Cathinone." In contrast, MDMA is Classified as an "amphetamine: based on its core structure." Exhibit C.

As a cathinone, Methylone is distinguishable from MDMA by the presence of a ketone group, which is absent from the MDMA structure. Dr. Dudley provides two-dimensional diagrams to illustrate the differences in chemical structure between the two drugs. An additional part of Dr. Dudley's chemical structural analysis is a comparison of the syntheses of the two substances. He explains that Methylone and Cathinone follow similar analogue paths. In contrast, the synthesis of MDMA is different because it is an amphetamine, not a Cathinone. *Id.*

The presence of the ketone in cathinones accounts for may chemical properties that distinguish it from amphetamines. Dr. Dudley graphically presents five chemical transformations of Cathinone that are similarly applicable to Methylone, but are inapplicable to MDMA. He did not find *any* chemical reaction common to MDMA and Methylone at the exclusion of Cathione. Dr. Dudley concludes:

> Therefore, I conclude that Methylone is more similar in chemical structure to Cathinone than it is to DA. Methylone is a cathinone. Its synthesis and reactivity patters are those of cathinones, not amphetamines like MDMA.

Id.

Based on the above analysis of the chemical structure of Methylone, it is a cathinone and more akin in chemical structure and properties to Cathinone than MDMA.

2. <u>Effects on the Central Nervous System and Relative Potency</u>[4]

Anthony DeCaprio, PHD, DABT, is a toxicologist, Associate Professor of Chemistry and Biochemistry at the International Forensic Research Institute of Florida

[4] Given that Khat/Cathinone, MDMA, and Methylone are typically classified as stimulants with only marginal hallucinogenic properties, Mr. Chong combines the discussion of Prongs Two and Three of application note 6 into this section.

International University. His declaration is submitted to address both the effects of Methylone on the central nervous system and relative potency prongs. Exhibit B.

Dr. DeCaprio opines that Methylone and MDMA both stimulate the central nervous system (CNS), however, Methylone is 5-fold less potent than MDMA based on the majority of pharmacological evidence presented in peer-reviewed publications. *See* Decaprio Dec. ¶ 27.

Dr. DeCaprio generally explains how stimulant drugs effect the central nervous system (CNS) by modifying the base line levels of three major neurotransmitter molecules in the brain: dopamine, norepinephrine, and serotonin. Serotonin mediates mood and empathic feelings. Norepinephrine controls alertness, energy, and physiological functions, such as increased heart rate and blood pressure. Dopamine mediates pleasure and reward pathways. *Id.* at ¶¶ 5, 10.

By way of simplistic explanation, the drug increases the levels of these transmitters in the synaptic cleft (the area between two nerve cells) which results in an increased rate of firing nerve impulses. The drug either acts as a substrate and/or a blocker of specific transporter proteins that move the neurotransmitters from the synaptic cleft back into the presynaptic nerve cell. This movement of the neurotransmitters is known as the reuptake mechanism. If the reuptake mechanism is inhibited, neurotrasmitter levels remain in the synaptic left, thereby increasing the stimulation of the post-synaptic neuron. *Id.* at ¶¶ 5-6. 9.

Dr. DeCaprio explains that Methylone and MDMA are both considered transporter substrates, meaning that the drug binds to a specific transporter and is brought to the nerve cell. This process inhibits the reuptake mechanism and sends the neurotransimtter out of the cell and ito the synaptic cleft. *Id.* at 7. Dr. DeCaprio

describes several studies that compare the relative effects of methylone and MDMA upon the CNS. These studies include peer-reviewed *in vitro* and animal studies. *Id.* at 20-26.

All the studies show that Methylone is overall less potent than MDMA when testing a variety of psychoactive effects on the neurotransmitters. Cozzi and colleagues conducted an *in vitro* experiment that found MDMA was 13-fold more potent than Methylone for inhibiting serotonin uptake by the vesicular monoamine transporter; MDMA was twice as potent as Methylone in inhibiting dopamine reuptake and three-fold more potent in inhibiting serotonin reputake in rat brains. *Id.* Baumann and colleagues conducted animal experiments that showed MDMA to be 3-fold, 2.5-fold, and 5-fold more potent than methylone in inhibiting norepenephrine, dopamine, and serotonin release, respectively. *Id.* at ¶22. A second study by Baumann regarding MDMA was 3-fold more potent in stimulating dopamine; 8-fold and 6-fold more potent than Methylone for inhibiting reuptake and stimulating, respectively, or serotonin. The two drugs were approximately equipotent for inhibiting dopamine reuptake. MDMA was 3- to 4-fold more potent for uptake and release fo norepinephrine. *Id*. at ¶ 23.

Dr. DeCaprio also provides a detailed explanation of a recent *in vitro* study by Eshleman and colleagues reporting that Methylone has 4-fold high affinity for the dopamine transport than MDMA, but a 1.7-fold lower potency than MDMA for inhibition of dopamine reuptake. Methylone exhibits a 6-fold lower affinity for SERT and an 18-fold lower potency than MDMA for serotonin reuptake inhibition. Testing of other functional activity showed that MDMA has higher potency for a number of other endpoints. *Id.* at ¶ 24. Simmler and colleagues reported similar trends as found by Eshlemann. In contrast to the majority of other published research, Simmler reported 3.5-fold higher potency for dopamine reuptake inhibition by Methylone compared to MDMA. However, he agreed with other publishers that methylone was 5-fold less

potent for stimulation of dopamine released and 2-fold less potent for serotonin release compared to MDMA. *Id*. at ¶ 25.

Finally, Dr. DeCaprio discussed some studies on behavioral pharmacology and locomotor activity in animal studies. Dal Cason and colleagues found that rats previously trained to discriminate MDMA were able to substitute Methylone for MDMA, however did so with lower potency and rate of response. Baumann and colleagues injected rats with both drugs and observed that MDMA was substantially more potent than Methylone in effecting movement. Lopes-Arnau and colleagues found that MDMA and Methylone were equipotent in increasing locomotive activity in mice. Finally, Miyazawa and colleagues found MDMA to produce greater effects that Methylone in eight of ten measurements. *Id.* at ¶26.

Based on his review of the above studies, Dr. DeCaprio concludes that Methylone is 5-fold less potent than MDMA.

The Drug Enforcement Administration, Office of Diversion, drug an Chemical Evaluation Section, reported that based on animal study, methylone was one-half-less potent than MDMA in drug discrimination assays. *See* DEA, 3,4-Methlenedioxymethcathinone (Methylone). Exhibit E**.** Dr. DeCaprio reviewed this DEA document and noted that it was based on a single unpublished contract study that is unavailable for review. Decl. ¶ 28.

There is considerably less information available on the comparative effects and potencies of Methylone, MDMA, and Cathinone. In the only published report available that examined the pharmacological parameters for the three drugs, the Simmler study confirmed that Methylone is among a class of drugs characterized as synthetic cathinones. Like other synthetic cathinones, Methylone shares characteristics and

effects with both MDMA and Cathinone. More specifically, all of the cathinones are inhibitors of the monoamine transporters. Methylone's relative DAT versus SERT inhibition potency, resembles that of cocaine and MDMA, whereas Cathinone's profile is more closely related to amphetamine/methamphetamine. On the other hand, Cathinone and Methylone produce similar neurotransmission reactions based on their shared ketone properties. Exhibit K.

Regarding relative potencies, the Simmler study reported a slightly higher potency for norepinephrine reuptake inhibition, approximately equipotent dopamine reuptake inhibition, and at least 73-fold lower potency for serotonin uptake inhibition by cathinone as compared to MDMA. In addition, cathinone exhibited approximately 4-fold higher and at least 18-fold lower potency for stimulation of dopamine and serotonin release, respectively, from preloaded cells. Exhibit K. While Methylone is generally more potent than cathinone, the study noted that Methylone is less potent with respect to NET inhibition, which is a measure of monoamine transporter inhibition. EXHIBIT K.

Thus, from this data, it can be concluded that Methylone shares characteristics and effects with both MDMA and Cathinone. It is considerably less potent than MDMA, but significantly more potent than Cathinone. Because Methylone falls somewhere in between MDMA and Cathinone in strength, Mr. Chong requests that this Court apply the rule of lenity and find that Methylone is most similar in effect and potency to Cathinone/Khat. *Cf. Chowdury*, 639 F.3d at 586 (noting that following application note 6 is not an exact science and that it may not be possible to match substances under each of the factors).

3. The Appropriate Marijuana Equivalency Ratio for Methylone is 10:1

Given that Cathinone is the more closely related drug for the purposes of calculating Mr. Chong's base offense level, that substance's marijuana equivalency ratio should be adopted. While the sentencing guidelines reference Khat as a controlled substance with a marijuana equivalency of .01, that substance is not itself a controlled substance. USSG 2D.1.1, note 8(D). It is considered a Schedule I Controlled Substance only when the plant contains the active ingredient Cathinone. *United States v. Hassan*, 578 F.3d 108, 114 (2d Cir. 2008). Because khat plants contain, on average, about .1% by weight of Cathinone, Mr. Chong is requesting that this Court apply a marijuana equivalency ratio of 10:1.

B. Mr. Chong's Offense Level Should Not Be Based On Acquitted Conduct

1. Mr. Chong was acquitted of all conduct relating to the importation of Methylone

The government charged Mr. Chong in a four count superseding indictment. Counts One, Two, and Four related to his alleged importation of a significant quantity of drugs. Count Three charged Mr. Chong with conspiracy to possess Methylone with the intent to distribute, which involved Mr. Chong's distribution of small quantities of pills to his friends between January 2012 to September 2013.

The jury largely rejected the government's case. It found that Mr. Chong was not guilty of any conduct relating to the importation of Methylone. To be sure, the jury acquitted Mr. Chong of: conspiring to import Methylone, importing Methylone, and attempting to possess the Methylone that was imported on September 10, 2013.

The jury did convict Mr. Chong of Count Three—which involved the smallest quantity of drugs. Count Three related to Mr. Chong's distribution of small quantities of pills at parties over an almost two-year period. Fortunately, Mr. Chong and his friends kept a clear running tally of the amount of drugs involved in their exploits, which the government introduced at trial as Exhibit 14.[5] These communications confirm the following transactions:

DATE	QUANTITY OF PILLS	PAGE
5/16/2013	2	2
5/16/2013	2	3
5/17/2013	5	12
6/25/2013	5	27-35
7/17/2013	2	68
8/9/2013	10	129
9/7/2013[6]	6	143-144

According to these communications, there was a total of 32 pills involved in the conspiracy.[7] The pills discussed by Mr. Chong and his friends typically contained about one-tenth of a gram, which means the total quantity of Methylone involved in the

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[5] Government's Exhibit 14 is attached to this filing, unredacted, as Exhibit D.

[6] The exhibit includes a discussion regarding selling 100 grams of a "research chemical." *Id.* at 151. Mr. Chong asserts that he should not be sentenced based on this substance because it has not been identified. Even if this Court assumes that substance was Methylone, it should still not be considered for purposes of sentencing because it was not part of the conspiracy between Mr. Chong and his friends. Indeed, the conversation makes clear that the Mr. Chong's friends were not familiar with these transactions.

[7] Mr. Chong does not doubt that he and his friends shared other pills that were not discussed in their text messages. He asserts that these messages are a more accurate estimate of the true quantity of the Methylone involved than the government's witnesses' inconsistent recollections.

conspiracy was 3.2 grams. *See* Trial I Transcript, page 238 (Testimony of Agent Schmidt). But these pills do not contain pure Methylone, and are usually cut. *See* Trial II Transcript, page 588 (Government Closing Argument). Assuming that the pills discussed in Exhibit D were 50% pure, the total amount of Methylone involved in the offense would be about 1.5 grams.

2. <u>This Court should not sentence Mr. Chong based on Acquitted conduct</u>

The Department of Probation calculated an offense level based on 500 grams of Methylone. Probation based this calculation on the amount of drugs that were seized from Co-defendant Sign, rather than the smaller 1.5 gram quantity for which he was convicted.

Increasing the amount of Methylone for which Mr. Chong is responsible by a multiple of 300 based on acquitted conduct violates Mr. Chong's Fifth and Sixth Amendment rights by rejecting the proper role of the jury as the arbiter of guilt. The acquittal enhancement is, therefore, unconstitutional and violates the substance of the right to a jury trial.

Mr. Chong asserts that reliance on acquitted conduct at sentencing "trivializes [the jury's] fact-finding function and its binding determination of the defendant's legal innocence. *United States v. Canania*, 532 F.3d 764,766 (8th cir. 2008.)(Bright, J., concurring.) The Supreme Court has emphasized that a trial court's "authority to sentence derives wholly from the jury's verdict." *Blakely v. Washington*, 542 U.S. 296 (2004). Just as courts may not direct a verdict of guilty and have no power to set aside an acquittal, the court cannot treat a jury's acquittal simply as an act of calculated fact-finding by reconsidering the truth of a verdict at sentencing. *See Sparf. V. United States*, 156 U.S. 51, 105-106 (1895). The jury's not guilty finding is absolute, and cannot

impose a different finding, thus "reducing the jury's role 'to the relative importance of low-level gate keeping.'" *United States v. Booker*, 543 U.S. 220, 230 (2005)(quoting *Jones v. United States*, 526 U.S. 227, 244 (1999).

The federal courts of appeals, including the Second Circuit in *Vaughn*, have based their decisions approving a trial court's reliance on acquitted conduct at sentencing on two grounds. First, courts have found that the Supreme Court's decision in *United States v. Watts*, 519 U.S. 148 (1997)(*per curiam*), bars any attack on the validity of the use of acquitted conduct at sentencing. See, e.g. *Vaughn* 430 F.3d. at 525-526.; *United States v. Home*, 474 F.3d. 1004 (7th cir. 2007); *United States v. Gobbi*, 471 F.3d 302,314 (1st Cir. 2006). However, *Watts* addressed the practice only in the context of the Double Jeopardy Clause and, as the Supreme Court has explicitly recognized, did not address whether the use of acquitted conduct at sentencing violated the rights to a jury trial or to due process.

Second, courts have held that the Supreme Court cured any constitutional problem by rendering the sentencing guidelines advisory in *Booker*. 543 U.S. 220 (2005). See, e.g. Vaughn, 430 F.2d. at 527; *United States v. Mercado*, 474 F.3d. 654, 657-58 (9th Cir. 2007); *United States v. High Elk*, 442 F.3d. 622,625 (8th cir 2006); *United States v. Magallanez*, 408 F.3d 672, 684-85 (10th Cir. 2005).[8] However, these cases ignore the fundamental constitutional problem: reliance on acquitted conduct undermines the right to a jury and due process even in a post-*Booker* world.

[8] While these circuit courts have not held that the use of acquitted conduct enhancements violates the federal constitutional rights of the defendant, a number of state courts of last resort have done so. *See State v. Jones*, 745 N.W.2d 845, 849 (Minn. 2008); *Trusky v. State,* 7 P.3d 5, 13-14 (Wyo 2000); *State v. Marley*, 364 S.E.2d 133, 139 (N.C. 1988); *State v. Cote*, 530 A.2d 775, 785 (N.H. 1987); *Gambill v. State*, 436 N.E.2d 301,305 (Ind. 1982).

Watts was limited to the question of whether sentencing based on acquitted conduct violated the Double Jeopardy Clause of the Fifth Amendment. The Court reversed the decision of the court of appeals based only on "the implications of the Guidelines" and the appellate panels "erroneous views of [the Court's] Double Jeopardy jurisprudence." *Watts*, 519 U.S. at 154. Nowhere in its limited decision did the Court address the permissibility of acquittal enhancements as a matter of due process or the right to a jury trial.

Watts did not rule out all constitutional challenges to acquittal enhancements. Justice Stevens made this clear in his dissent in *Booker*. 543 U.S. at 240 n.4. Although the Supreme Court held in *McMillan v. Pennsylvania*, 477 U.S. 79, 91-92 (1986), that consideration at sentencing of uncharged conduct under a preponderance standard "generally satisfies due process", *Watts*, 519 U.S. at 156, the Court has not addressed the more specific and constitutionally troubling question whether the consideration of acquitted conduct, in conflict with a jury's verdict satisfies due process.

The advisory nature of the guidelines does not ameliorate the constitutional infirmities of considering acquitted conduct at sentencing. A sentencing court is required to calculate and consider the guideline range, and it remains a benchmark or starting point for sentencing. *See*, e.g. *Gall v. United States*, 552 U.S. 38,49-50 (2007).

Further, the use of acquittal enhancements goes to the heart of the criminal justice system, and imperils public confidence in the criminal justice system.[9] As Judge Barkett

[9] Legal scholars have explained that "the message that a defendant may permissibly be punished for conduct for which a jury found him not guilty is so counterintuitive to ordinary citizens, that it cannot help but have a negative impact on public confidence in the criminal justice system." Barry L. Johnson, *If at First You Don't Succeed - Abolishing the Use of Acquitted Conduct in Guidelines Sentencing*, 75 N.S.L. Rev 153, 185 (1996). Another scholar has opined that the use of acquittal enhancements conveys to jurors that fact-finding was trivial. Marguerite A. Driessen, *Challenging the Irrelevant Acquittal*, 11 Geo. Mason L.Rev. 331, 353-354 (2002).

of the 11th Circuit has remarked, "it perverts our system of justice to allow a defendant to suffer punishment for a criminal charge for which he or she was acquitted." *United States v. Faust*, 456 F.3d. 1342, 1350 (11 Cir. 2006).

C. <u>Mr. Chong's Offense Level Should Not Be Enhanced For Aggravated Role</u>

Probation recommends that Mr. Chong's offense level be enhanced two points because he played an aggravating role. PSR ¶ 18. Mr. Chong objects to this enhancement for two reasons. First, it appears that Probation is primarily basing this enhancement on Mr. Chong's conduct relating to the importation of Methylone. PSR ¶¶ 8-11. As explained in the preceding section, however, Mr. Chong was acquitted of this conduct and he objects to being sentenced based on these unproven allegations.

Second, and to the extent that the enhancement is based on Mr. Chong's conduct relating to the distribution of pills to his friends at parties, his role should not be enhanced because he did not act as an organizer/leader of the scheme. His role is equal to that of codefendant Singh.

While Mr. Chong apparently had a connection to purchase Molly, Singh would coordinate with the group's friends and instruct him to purchase certain amounts of the drug so that he (Singh) could distribute them to the group. Exhibit D. At times, Singh would go around Mr. Chong and purchase the drug directly from Mr. Chong's apparent source, "Alex." *See* Transcript Trial II, pages 208-09. While Singh may have "assumed" that Chong was involved in these transactions, it appears that Singh would take his friends' orders for the drug, and then directly place the order with "Alex" and later pick up the drug, all without Mr. Chong's involvement. *Id.*

Singh would also pressure Mr. Chong to consume more drugs. On June 25 of last year, for example, Mr. Chong explained that he did not wish to consume any drugs because he was trying to "clean his system." Exhibit D, pages 28, 36. Singh repeatedly attempted to pressure Mr. Chong in to taking the drug. *Id.*

At times, Singh would also encourage Mr. Chong to distribute Molly, and explained that the two should charge $50 per pill and that he and Chong would "split the profit." *Id.*, page 45. Singh also told Chong that they could increase the price by (falsely) telling people of the drug's increased potency. *Id.* After Singh discussed his plan further, he instructed Chong: "Try to sell this shit n make money. . . . A reg[ular] job isn't cutting it for me lol." *Id.,* page 51.

III.

ALTERNATIVELY, THIS COURT SHOULD REJECT AND REPLACE THE MDMA GUIDELINES AND APPLY A FAIR MARIJUANA EQUIVALENCY RATIO FOR METHYLONE

If this Court rejects Mr. Chong's argument that Khat/Cathione is the more closely related drug to Methylone and decides to calculate Mr. Chong's offense level based on the MDMA guidelines, he urges this Court to exercise its discretion to reject the 500:1 ratio set forth in the Ecstasy guidelines and replace it with a 50:1 ratio, which more accurately and fairly carries out the goals of punishment. As explained below, the MDMA guidelines are largely based on now repudiated science and flawed analysis. After this Court determines the appropriate marijuana equivalency for MDMA, Mr. Chong requests that it then exercise its authority to apply a fair ratio for Methylone. Mr. Chong urges this Court to adopt a 10:1

marijuana equivalency ratio for methylone, which reflects this significantly reduced potency and public health risk of Methylone as compared to MDMA.

A. <u>The Court's Discretion To Disagree With The Guidelines</u>

Mr. Chong requests that this Court vary from the guidelines on policy grounds and find that the advisory Ecstasy guidelines are based on repudiated science and flawed analysis. In *Kimbrough*, the Supreme Court held that sentencing judges could significantly vary from the drug guidelines on the basis of a categorical policy disagreement with them. 552 U.S. at 108-10 (disagreeing with the flawed rationale the 100:1 disparity between crack cocaine and powder cocaine when both had similar physiological and psychotropic effects). The "point of *Kimbrough* [was] a recognition of district courts' authority to vary from the crack cocaine Guidelines based on policy disagreement with them, and not simply based on an individualized determination that they yield an excessive view sentence in a particular case." *Spears v. United States*, 555 U.S. 261, 264 (2009).

A district court's authority to reject a drug equivalency ratio, by necessity, is complimented with the power to replace it with an alternative ratio. *Id.* at 265. The *Spears* Court ruled, "A sentencing judge who is given the power to reject the disparity created by the crack-to-powder ration must also possess the power to apply a different ratio which, in his judgment, corrects the disparity." *Id.*

The Sixth Circuit in *United States v. Kamper*, 748 F.3d 728 (2014), discussed the "reject and replace" authority in the context of a challenge to the Ecstasy guidelines. In that case, the district court chose not to reject the MDMA guidelines because it believed that the Sentencing Commission was better suited than judges to gather and analyze scientific evidence and determine national sentencing policy; and

it did not want to create sentencing variations among district judges. 748 F.3d at 743. Although the Sixth Circuit ultimately ruled that error was harmless, it found that the district court erred in failing to recognize its authority disagree with the Ecstasy guidelines. Id. at 744. After reviewing *Kimbrough* and *Spears*, the *Kamper* Court ruled:

> A sentencing judge thus has the authority both to reject and replace a Guideline ratio purely based on his disagreement with the policy justifications underlying the ratio or his determination that the ratio regularly produces unwarranted sentencing disparities.

Kamper, 748 F.3d at 741.

When evaluating a *Kimbrough* challenge to the MDMA guidelines, the *Kamper* Court held that a sentencing court must "confront the merits of any scientific or policy arguments. *Id.* at 744.

B. An Overview of the Commission's 2001 Ecstasy Report to Congress: History Repeats Itself

The Commission's amendment to the MDMA guidelines in 2001, paralleled its development of the crack cocaine guidelines. For both substances, the Commission responded to congressional directives for increased punishment rather than adhering to its institutional role in evaluating empirical about past sentencing practices. *See Kimbrough*, 552 U.S. at 96-97.

Over 13 years ago, the Commission adopted the 500:1 ratio for Ecstasy in response to the legislative directive in the Ecstasy Anti-Proliferation Act of 2000, Pub. L. No. 106-310 (the "Act") to increase the penalties for trafficking MDMA and its derivatives. The Commission prepared a report to the Congress, entitled "MDMA

Drug Offenses: Explanation of Recent Guideline Amendment," dated May 2001 [hereinafter referred to as the "Ecstasy Report" and attached as Exhibit F].

The justification for increasing the crack cocaine punishment in 1986 is nearly identical with the rationale supporting greater punishment for MDMA. In *Kimbrough*, the Supreme Court described the history of the crack cocaine guidelines as stemming from public and political concern that crack cocaine was more dangerous to health and society than powder cocaine and its use was prevalent among teenagers. 552 U.S. at 95-96. The Ecstasy Report reiterated similar concerns about the increase use of MDMA among young people and the misconception that MDMA was more dangerous than powder cocaine. Ecstasy Report, pp. 2-3; *see generally,* Rosenbaum, *Ecstasy: America's New "Reefer Madness," Journal of Psychoactive Drugs* 3 (Apr.-Jun. 2002)(discussing the history of regulating MDMA in response to media and political attention given to emergence of MDMA in the "rave culture")(Exhibit J).

Like the crack cocaine guidelines rejected in *Kimbrough* and *Spears*, the increased punishment for Ecstasy offenses was based on empirically flawed methodology and misconceptions. As discussed more fully below, the main fallacy of the Commission's decision was its misapprehension that MDMA was more harmful to health and society than powder cocaine. Second, the Commission relied upon scientific studies, some of which were dubius at the time, and many of which have been now repudiated with the advancement of brain imaging technology and improved testing procedures.

The Ecstasy Guidelines categorically result in over-punishment MDMA offenses and create an irrational disparity between defendants sentenced for MDMA offenses compared to those sentenced for distributing the more harmful powder

cocaine. In terms of the Sentencing Reform Act, the MDMA guidelines categorically punish offenders greater than necessary to promote the goals of punishment. More particularly, the MDMA guidelines create an irrational and unfair disparity in sentencing between MDMA and powder cocaine distributors. *See,* 18 U.S.C. §3553(a)(6).

The Commission decided that the punishment for MDMA should be lesser than heroin (1000:1), but greater than cocaine (200:1). It first distinguished MDMA from heroin, finding that (1) there are more heroin cases in the federal system then in MDMA; (2) heroin is more addictive than MDMA; (3) the injection of heroin results in more emergency room visits and deaths than MDMA, which is usually taken orally; (4) heroin is associated with violence, while the users of MDMA do not resort to violence; and (5) because heroin is injected, it causes the spread of hepatitis and HIV. *Id.* at 5., Exhibit F. The obvious shortcoming of the Commission's analysis is that it did not bother to draw such comparisons between MDMA and powder cocaine. If this neglected comparison had be performed, the results would show that powder cocaine is far more dangerous than MDMA.

The Commission justified the greater penalty for MDMA than powder cocaine on three conclusions: (1) MDMA is neurotoxic and powder cocaine is not; (2) powder cocaine is not marketed aggressively to youth as MDMA; and (3) MDMA is both a hallucinogen and stimulant while powder cocaine is only a stimulant. *Id.* These conclusions have been since been called into doubt and repudiated.

The Commission was greatly concern about the neurotoxicity of MDMA due to the perceived effects on serotonin levels in the brain. Serotonin is a neurotransmitter associated with memory and mood. Id. at 8-10. It noted that the

scientific studies in this area were subject to debate. As discussed below, many of the studies upon which the Commission relied have now been repudiated.

In evaluating the social harms presented by MDMA, the Commission relied on data showing that MDMA use was increasing among youth, noting that 1.3 million high school students experimented with it in 2000. It also found that MDMA trafficking cases accounted for a small portion of federal prosecutions but the number had increased from114 cases in 1999 to 169 cases in 2000. The Commission also found that the number of emergency room visits related to MDMA increased from 250 in 1994, to 2,850, five years later in 1999. It concluded that there were nine deaths related to MDMA in the two year period of 1999 and 2000. It noted, however, that the emergency room visits and deaths were less than other drugs. *Id.* at 10-12. Although many drugs, both controlled and non-controlled, present risks of harm to people, these figures do not justify an MDMA ratio that is more than twice the ratio of cocaine, which stunt the above statistics.

C. <u>The *McCarthy* Opinion</u>

Mr. Chong appeals to the Court to exercise its discretion to reject the guideline's 500:1 ratio and replace it with a ratio of no more than 50:1. The Court is encouraged to adopt the reasoning and conclusions of *McCarthy* and *Qayyem*.

For the Court's convenience and consideration, the following exhibits are attached in support of Mr. Chong's request for a policy variance under *Kimbrough*: the *McCarthy* opinion, Exhibit G; the transcript of the evidentiary hearing held in *McCarthy*, Exhibit H; the *Qayyem* opinion, Exhibit I; and various scientific journals

and secondary resources on MDMA, Exhibit J.[10] Mr. Chong submits that the Court may reasonably rely upon these authorities and materials, as well as Dr. Grob's attached affidavit (Exhibit A), in exercising its *Kimbrough* authority. Portions of the evidentiary hearing and scientific studies will be discussed more fully below.

In *McCarthy*, U.S. District Court Judge William H. Pauley, III, Southern District of New York, issued an opinion on May 19, 2011, specifically addressing the flawed science and rationale employed by the Commission when increasing the punishment for MDMA offenses. Although the opinion is unpublished, it is especially persuasive and helpful to this Court because it was based a two-day evidentiary hearing at which four expert witnesses testified (two defense experts and two government experts) and the review of numerous scientific journals. The evidence updated the state of scientific research and data since the 2001 Ecstacy Report, as well as the harms of Ecstasy compared to other drugs. *McCarthy* at *2-3, Exhibit G. After considering the documentary evidence and expert testimony, Judge Pauley found that the risks of harm to human health was less severe than previously believed; and the Commission's analysis of its harms - particularly as compared to cocaine - was selective and incomplete. *Id.*

The *McCarthy* Court found that "much of the evidence indicates that MDMA is less harmful than cocaine *Id.* at *4 n.2. Judge Pauley was especially critical of the Commission's "opportunistic" selective analysis:

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[10] Counsel from the American Civil Liberties Union, Jay Rorty and Scott Michelmann, raised the *Kimbrough* challenges presented in *McCarthy* and *United States v. Trung Dinh Phan*, Case No. CR10-27-RSM (W.D. Wash. May 3, 2011)(finding MDMA guidelines to be flawed and granting downward variance without adopting replacement ratio). In *Phan*, the district court found that the MDMA guidelines were empirically flawed. Rather than adopt a replacement ratio, it merely included it as a consideration in its analysis of the sentencing factors. *See,* Michelmann & Rorty, Doing Kimbrough justice: implementing policy disagreements with the federal sentencing guidelines, 45 Suffolk U. L. Rev. 1083, 1122 (2012)(discussing the analytical steps taken by district courts in exercising *Kimbrough* authority). The pertinent scientific studies referenced in the *McCarthy* evidentiary hearing and opinion are contained in these Exhibit J.

> [T]he Commission's analysis focused on the few ways in which MDMA is *more* harmful than cocaine, while disregarding several significant factors suggesting that it is in fact less harmful. Such opportunistic rummaging is particularly stark when viewed against the Commission's rationale for adopting lighter sentences for MDMA than for heroin. . . . The Commission's selective analysis is incompatible with the goal of uniform sentencing based on empirical data.

Id. at *4 (emphasis in original), Exhibit G.

The *McCarthy* Court found that the Commission decided to punish the distribution of MDMA more harshly than cocaine based on three reasons, as described above: (1) MDMA is neurtotoxic while cocaine is not; (2) MDMA is marketed to youth more aggressively than cocaine; and (3) MDMA is both stimulant and hallucinogen while cocaine is only a stimulant. Id. *1; *see,* Ecstasy Report at 5, Exhibit F.

The Judge Pauley found that experts for both the defense and the government repudiated the first and third reasons based on the more recent scientific literature. Both parties' experts found that MDMA's status as both a stimulant and hallucinogen was factually unsupported and irrelevant. *McCarthy*, *3. With respect to the neurotoxicity issue, Judge Pauley noted that both the defense and government experts agreed that the effects of MDMA upon serotonin transporters were not as drastic as the studies upon which the Commission relied. *Id.* at *2. More recent studies showed that the effect of MDMA, although significantly significant, were relatively minor. *Id.*

The *McCarthy* Court performed the MDMA-cocaine comparison ignored by the Commission. The court concluded that data showed cocaine to be far more

harmful than Ecstasy: (1) cocaine is more commonly used than MDMA; (2) cocaine accounts for 553,530 emergency room visits while 12,748 were attributed to MDMA; (3) cocaine is very addictive while MDMA is one of the least addictive controlled substances; (4) the negative health effects of cocaine are far more serious than MDMA; (5) the trafficking of cocaine is associated with violence; and (6) far more cocaine related cases are prosecuted in the federal system than MDMA. *Id.*, **3-4.

The *McCarthy* Court found that the marketing of MDMA to youth between the ages of 12 and 17 years old remained a valid concern and presented risks of harm. The Court, therefore, concluded that the Commission had valid grounds to increase the Ecstasy guidelines above the original 35:1 ratio, but it rejected the 500:1 ratio as lacking empirical support. It, therefore, applied a 200:1 ratio to account for the concern about young people using MDMA and the drug's dangers. *Id.,* *4.

After acknowledging the harms caused by distribution of illicit drugs, Judge Pauley emphasized the fundamental principle of sentencing:

> Yet this Court must also consider "the need to avoid unwarranted sentence disparities amoung defendants with similar records who have been found guilty of similar conduct." 18 U.S.C. §3553. This fundamental principle is violated when disparate drug equivalencies are established for similar narcotics based on an incomplete analysis. *See, Kimbrough*, 552 U.S. at 98.

McCarty, at *4.

In *Qayyem*, United States District Court Judge Kimba M. Wood, Southern District of New York, also rejected the 500:1 Ecstasy ratio based in large part upon a review of the transcripts of the evidentiary hearing held in *McCarthy*. WL 92287, **3-5. The *Qayyem* Court also applied a 200:1 ratio in a cases that involved the sale of MDMA and 1-benzlpperazine ("BZP"). It also found that the Commission's failure to compare the lesser harms of MDMA to the greater harms of powder cocaine

undermined the its findings. Exhibit I, at 2-3. The *Qayyem* Court agreed with *McCarthy* in concluding that the data comparing MDMA and powder cocaine showed that cocaine was more harmful than MDMA based on the greater number of federal prosecutions, emergency room visits, and violence associated with trafficking powder cocaine, as well as the highly addictive nature of powder cocaine relative to MDMA. *Id.* *3.

D. <u>Review of Scientific Studies on MDMA and Ecstasy Report</u>

The following will review the scientific premises on which the Commission relied in 2001, and the more recent scientific studies show the fallacies of these premises. It will also highlight pertinent testimony in the *McCarthy* evidentiary hearing that scientific studies and data.[11] (Exhibit H) This summary will also provide updated statistics relating to MDMA and cocaine. The Court is referred to the *McCarthy* and *Qayyem*, both of which review certain scientific studies and data. (Exhibits G & I)

The defense introduced the testimony of Helen Valerie Curran, a professor and researcher of psychopharmacology at the University College London (McCarthy TR 5-99), and John Halpren, M.D., a psychiatrist and researcher at the Laboratory for Integrative Psychiatry at McClain Hospital and assistant professor at Harvard Medical School (McCarthy TR 106-71). The government witnesses were Andrew Parrott, a psychopharmacologist and professor at the University of Swansea in Wales

[11] The transcript of the evidentiary hearing will be cited as "McCarthy TR" followed by the name of the witness. Citations to Ecstasy Report and scientific studies are placed in footnotes for ease of reading. The scientific papers and secondary resources referenced herein and discussed in the evidentiary hearing are contained in alphabetical order by lead author in Exhibit J. References to updated data available on the Internet are not contained in Exhibit J. Much of this summary of scientific evidence is attributed to the ACLU attorneys, Jay Rorty and Scott Michelman, who presented this discussion in sentencing memorandum filed in the *Phan*. *See, supra.* fn. 6.

(McCarthy TR 172-304), and Glen Hanson, a pharmacist and toxicologist at the University of Utah. (McCarthy TR 304-93). All the witnesses had significant experience in the research and study of MDMA.

1. <u>The Commission relied upon studies were flawed and now repudiated</u>

This Court should be skeptical of the scientific studies upon which the Commission relied over 13 years ago. These studies were rife with flaws, including the use of inappropriately high doses in animal testing; the lack of adequate controls over human test subjects; and non-replicated studies with dubious assumptions.

At the time of the Commission's review of the scientific literature in 2001, most of the studies were performed on animals with few controlled studies of humans. McCarthy TR, 23 (Curren); 376 (Hanson), Exhibit H. Drs. Curren and Halpren outlined the improvements in the scientific study of MDMA occurring since the Commission's 2001 review: (1) there were more studies of the humans, including long-term studies and recovery time after MDMA use; (2) more animal studies were done with improved methods of administering doses that would more accurately translate to actual human usage; (3) newer studies of healthy humans receiving MDMA doses employing better controls; (4) improved brain imaging technology to better examine the effects of MDMA on serotonin transmitters; and (5) improved methods of testing the reliability of people participating in studies relying on self-reporting of drug usage. McCarthy TR, 9-11 (Curran), 116-20 (Hanson), Exhibit H.

2. <u>Commission's reliance on flawed animal studies: Overdosing rats, pigs, and Monkeys and then extrapolating harm to human brains</u>

A major flaw in the older MDMA research was the predominate technique of giving animals inappropriately high doses of MDMA to predict the consequences for human users. More particularly, the Commission relied on two studies that adhered to this method whereby monkeys, guinea pigs, and rats were given repeated high does of MDMA in order to extrapolate the effects on humans, particularly the effects upon the human brain.[12]

Newer studies have repudiated the validity of administrating such high doses of MDMA in these earlier animal studies.[13] For example, the Commission relied upon the Commins' study in which rats were given between 10 and 40 milligrams of MDMA per kilogram of body weight (expressed in scientific terms as "mg/kg"), twice a day for two weeks.[14] The Commission relied on the Commins and Ricaurte studies as support for the conclusions that MDMA produced lasting deficiencies in the serotonin nerve cells. Ecstasy Report, pp. 8-9, Exhibit F.

The more recent research suggests an appropriate dose for animal testing would be between 1 and 3 mg/kg.[15] Thus, the Commission relied on a study giving rats a dose equivalent of between *three and forty times* a normal human dose. More

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[12] *See,* Exhibit F, Ecstasy Report, at 9 n.16 (citing Ricaurte et al., *(+/-) 3,4-Methylenedioxy-methamphetamine ('Ecstasy')- Induced Neurotoxicity: Studies in Animals*, 42 Neuro-psychobiology 5-10 (2000); and Commins et al., *Biochemical and Histological Evidence that Methylenedioxy-methamphetamine (MDMA) is Toxic to Neurons in the Rat Brain*, 241 J. of Pharm. & Experimental Therapeutics 338-345 (1987)). (Studies in Exhibit J).

[13] *See, e.g.*, Baumann et al., *3,4-Methylenedioxymethamphetamine (MDMA) Neurotoxicity in Rats: A Reappraisal of Past and Present Findings*, 189 Psychopharmacology (Berl.) 407, 411 (2007); Green et al., *MDMA: On the Translation from Rodent to Human Dosing*, 204 Psychopharmacology 375, 375 (2009). (Exhibit J)

[14] *See* Commins, 241 Pharm. & Experimental Therapeutics at *339.*

[15] *See, e.g.*, Baumann, 189 Psychopharmacology (Berl.) at 411-13.

recent animal studies that have used more moderate dosage or self-administration have found little or no evidence of lasting harm.[16]

Dr. Curren, the defense expert, explained that approximately 95% of MDMA users take about 100 miligrams of the drug once or twice a month. In commenting on the Commission's reliance on the animal studies using inappropriately high does, Dr. Curren stated:

> So, scientist reflecting back to 2001, would say those studies were not applicable, it was not valid to generalize from those incredibly toxic doses in animals to humans who use 100 milligrams once or twice a month. It's like trying to extrapolate from giving a young person, making them drink a bottle of whiskey or bourbon a day for 4 days meant something to college students having a few drinks. It's out of proportion; it became exaggerated.

McCarthy TR, 12-13 (Curren), Exhibit H.

The experts for both the defense and government in *McCarthy* acknowledged the importance of, and concurred with, recent scientific work calling into question the older technique of dose-conversion between species.[17] In fact, both government experts acknowledged that 1-3 mg/kg represents the dose an average or recreational user would consume,[18] and that low to moderate use was "consistent with a typical

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[16] *See, e.g.*, Fantegrossi et al., *Behavioral and Neurochemical Consequences of Long-term Intravenous Selfadministration of MDMA and its Enantiomers by Rhesus Monkeys*, 29 Neuropsychopharmacology 1270, 1278-79 (2004); Wang et al., *Methylenedioxymethamphetamine Administration to Rats Does Not Decrease Levels of the Serotonin Transporter Protein or Alter its Distribution Between Endosomes and the Plasma Membrane*, 314 J. Pharmacol. Exp. Ther. 1002, 1011 (2005).

[17] *See* McCarthy TR, at 120 (Halpern, defense expert); *id.* at 355-57 (Hanson, govt. expert).

[18] *See id.* at 299-300 (Parrott, govt. expert); *id.* at 356 (Hanson, govt. expert).

recreational ecstasy user."[19] The government expert also agreed that heavy use of MDMA was "rare."[20] Obviously, a substance that might have moderate effects at a low dose can have much more serious effects at a higher dose.[21] The Commission's reliance on dated and inaccurate assumptions about dosing levels undercuts the validity of its conclusions.

3. <u>Commission's reliance on flawed human studies: Inadequate controls</u>

The Commission concluded that MDMA was "used compulsively by some" and "may produce dysphoria" (i.e., depression). Ecstasy Report, p. 18, Exhibit F. It cited a 1999 research paper by Karl Jansen documenting case studies of three MDMA users.[22] As recognized by the experts for both parties, this paper is emblematic of problems that plagued the field of MDMA science over a decade ago, when many researchers failed to control for important variables.[23]

Dr. Curren explained that the Jansen study was terrible for its lack of subject controls because the subjects had other significant mental health and substance abuse issues. Yet, she noted that this was the study that the Commission used to find that MDMA had a potential to be addictive. One was an heroin addict in treatment with a family history of alcoholism and daily used MDMA; the second was a daily cannabis user with a family history of schizophrenia who used large quantities of Ecstasy in

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[19] *See id.* at 352 (Hanson, govt. expert).

[20] *See id.* at 272 (Parrott, govt. expert).

[21] *See id.* at 265-66 (Parrott, govt. expert).

[22] Exhibit F, Ecstasy Report, at 18 n. 61 (citing Jansen, *Ecstasy (MDMA) Dependence*, 53 Drug & Alc. Dependence 121-24 (1999)). (Exhibit J)

[23] Exhibit H, McCarthy TR, at 118-20 (Halpern, defense expert); *id.* at 178 (Parrott, govt. expert); *id.* at 331 (Hanson, govt. expert).

combination with amphetamines; and the third subject was a man with post-traumatic stress disorder who ingested 25 to 35 Ecstacy tablets every weekend and consumed a bottle of Jack Daniels almost every night. Needless to say, Dr. Curren opined that these subjects were not representative of the typical MDMA user. And, the government's expert, Dr. Parrott, agreed that these three individuals were "extraordinary" and statistical "outlanders."[24]

The failure to control for the important variables of simultaneous use of drugs other than MDMA, serious preexisting conditions, and family mental health problems, make it impossible to isolate the effects of MDMA in these case studies. The Commission's reliance on this type of paper for its conclusions illustrates both the underdeveloped state of MDMA research in 2001 and the use of flawed source material by the Commission in setting the current 500:1 ratio applied to Ecstasy.

4. <u>Commission's reliance on dated science and dubious assumptions</u>

The Commission also relied on several studies that were not able to be replicated, or studies fraught with methodological problems. The Commission cited research that have been called into question by more recent studies employing better technology.

For example, the Commission relied on a 1998 study by McCann and colleagues that took PET scans of subjects' brains and concluded that MDMA caused the loss of serotonin transporters "throughout the brain."[25] A 2010 article, Kish and

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[24] Exhibit H, McCarthy TR, at 39-40 (Currren); *id.* at 234-36, 239-41 (Parrott).

[25] Exhibit F, Ecstasy Report, at 9 & n.18 (citing Mathias, NIDA Notes, *"Ecstasy" Damages the Brain and Impairs Memory in Humans*, Pub. No. 99-3478 (Nov. 1999), in turn citing McCann et al., *Positron emission topographic evidence of toxic effect of MDMA ("ecstasy") on brain serotonin neurons in human beings*, 352 The Lancet 1433 (1998)).

colleagues, using more advanced brain imaging technology developed over the past dozen years, found that loss of serotonin transporters was much less prevalent than had been thought and, in explicit contrast to the McCann study, noted that the new study "did not find a global, massive reduction of brain [serotonin transporter] binding."[26] Another study performed in 2009 by Selveraj, opined that the reduction in serotonin transporters that does occur is reversible after users abstain from use – in other words, after users stop using, their brains return to normal.[27]

Some of the Commissions' authorities and claims are dubious on their very face. For example, the Commission cited, as an authority on purported MDMA harms, a website that the Commission itself noted consisted of "a mix of science, pseudo-science and lore." Ecstasy Report at 7 n. 9 (citing https://www.erowid.org). In another instance, the Commission suggests that MDMA must be more harmful than cocaine because MDMA is a stimulant and a hallucinogen whereas cocaine is merely a stimulant. Ecstasy Report at 5, Exhibit F. Apparently, the Commission believed that harm to humans can be gauged by summing the number of properties a drug has rather than measuring its actual effects. Both the defense and the government experts in *McCarthy* testified that simply counting the number of properties a drug possesses does not provide any information on its harmfulness.[28] Moreover, both the defense and government experts at the *McCarthy* cast doubt on the notion that MDMA could even be properly classified as a hallucinogen at all.[29]

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[26] Kish et al., *Decreased cerebral cortical serotonin transporter binding in ecstasy users: a positron emission tomography/[11C]DASB and structural brain imaging study*, 133 Brain 1779, 1791 (2010).

[27] Selveraj et al., *Brain serotonin transporter binding in former users of MDMA ('ecstasy')*, 194 Brit. J. of Psych. 355, 357 (2009).

[28] McCarthy TR, at 98-99 (Curran, defense expert); *id.* at 387 (Hanson, govt. expert).

[29] Id. at 164 (Halpern, defense expert); id. at 289-90 (Parrott, govt. expert).

5. Recent studies: ecstacy report overstates harms of MDMA

Since 2001, research refutes the Commission's conclusions regarding the harms of MDMA. The Commission attributed a variety of harms to MDMA, including memory impairment, increases in heart rate and body temperature, and death. Ecstacy Report at 7, 9, Exhibit F. More recent studies show that memory effects among MDMA users have been shown to be negligible or moderate, with users testing well within normal limits.[30]

Both the defense and the government experts in *McCarthy* acknowledged that a 2009 meta-analysis by Rogers and colleagues as a helpful synthesis of MDMA study data.[31] according to this meta-analysis, which synthesized the results of hundreds of MDMA studies, the effects of MDMA on memory, though statistically significant, were nonetheless "small," with the mean scores of users falling within normal ranges.[32] The government's expert, Dr. Parrott, accepted the conclusions of Rogers that MDMA users' neurocognitive functioning, though impaired, nonetheless remained "[w]ithin the normal range."[33]

The heart rate and temperature increases associated with MDMA use are minor (unlike the cardiovascular effects of cocaine) and are usually no greater than the

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[30] *See, e.g.,* Jager et al., *Incidental Use of Ecstasy: No Evidence for Harmful Effects on Cognitive Brain Function in a Prospective fMRI Study*, 193(3) Psychopharmacology (Berl.) 403, 403 (2007). (Exhibit J)

[31] McCarthy TR, at 18-19 (Curran, defense expert); *id.* at 239, 263 (Parrott, govt. expert).

[32] Rogers et al., *The harmful health effects of recreational ecstasy: a systematic review of observational evidence,* Health Tech. Assessment, Jan. 2009, at *xi*, *available at,* http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0014966.

[33] McCarthy TR at 264.

increases associated with moderate exercise.[34] Controlled administration of MDMA to human subjects in studies examining the therapeutic effects of MDMA have resulted in no serious adverse reactions among study participants.[35] The most significant effects of MDMA are limited to the immediate rise in heart rate and body temperature, and a short-term change in brain chemistry, but even the government's experts acknowledged that all of these effects generally wear off within a week.[36] As the 2009 Rogers meta-analysis summarizes, what deficits do exist among MDMA users are "unlikely" to "significantly impair the average ecstasy user's everyday functional or quality of life."[37]

Finally, deaths from MDMA are rare. One British study examining deaths over a ten-year period found approximately 10 deaths per year attributable to MDMA use alone.[38] This represents, on average, approximately two deaths per 100,000 MDMA users from 2001 to 2007, or two-thousandths of 1%.[39] In McCarthy, the

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[34] Jerome, *(+/-)-3,4-methylenedioxymethamphetamine (MDMA, "Ecstasy") Investigator's Brochure* 12 (2007). (Exhibit J)

[35] *Id.* at 17-20.

[36] *See* McCarthy TR at 243-44, 252 (Parrott, govt. expert); *id.* at 354 (Hanson, govt. expert).

[37] Rogers, Health Tech. Assessment, at *xii*.

[38] *See* Schifano et al., *Overview of Amphetamine-Type Stimulant Mortality Data -- UK, 1997-2007*, 61 Neuropsychobiology 122, 125 tbl. 1 (2010). This table, which covers mortality data for a ten-year period, found 104 "deaths where MDMA was identified on its own" as the cause of death. *Id.* This category is to be distinguished from the number at the top of the table, 605 deaths, which includes all individuals who had MDMA in their systems at the time of death. *Compare id.* at 123 (explaining that the greater figure, "np-SAD" deaths, includes cases in which coroners found the "presence of controlled drugs at post-mortem"), *with id.* at 124 (noting there were 104 cases out of the 605 in which ecstasy was "identified on its own" as the cause of death); *see also* Ex. 1, NY TR at 87 (Curran, explaining this distinction).

[39] *See* Schifano, 61 Neuropsychobiology at 128 tbl. 6; *see also* Rogers, Health Tech. Assessment, at *xii* ("Ecstasy . . . remains a rare cause of death when reported as the sole drug associated with death related to drug use.").

experts for both sides noted that cocaine was a more frequent cause of death than MDMA and that death from MDMA is rare.[40]

In sum, the Commission appears to have misunderstood the very nature of the drug. The Commission's inaccurate conclusions about the harms of MDMA at the time it devised the MDMA Guideline should not now form the basis for punishment of MDMA offenders, including Mr. Chong.

6. <u>The Commission's fear of particular harm to youth has not been borne out by national experience</u>

The Commission also identified as a justifications for the increased MDMA guidelines the concern that MDMA was heavily marketed to youth and that use began at an early age. Ecstasy Report at 5, 12-14, Exhibit F. The Commission again compared MDMA unfavorably to cocaine. In so doing, it concluded that "powder cocaine is not as aggressively marketed to youth in the same manner as MDMA." *Id.* at 5. The Commission's concern about youth use and youth harm has proved unfounded over the last several years and the comparison to cocaine incorrect.

The Commission relied upon the federally-funded "Monitoring the Future" survey by the University of Michigan to find that, despite some recent modest decreased in MDMA use, there was a sharp increase in the use of Ecstasy among secondary school and college students over time.[41] This same ongoing survey has

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[40] McCarthy TR, at 11 (Curran, defense expert); 293 (Parrott, govt. expert); 366 (Hanson, govt. expert).

[41] Ecstasy Report at 13 n. 40, *citing,* Monitoring the Future Study 2000, Univ. Mich.,table 1; *id.* at 13, n. 41, *citing* Johnston et. al., "Ecstasy" use rises sharply among teens in 2000; use of many other drugs steady but significant declines are reported for some, Univ. Mich. (Released Dec. 14, 2000) at 3.

shown significant declines in Ecstasy use since 2001. The most recent version of the Monitoring the Future Study concludes:

> Ecstasy (MDMA) joined this set of long-established, more prevalent drugs for a period of time, but annual prevalence rates for ecstasy dropped considerably between 2000 and 2009, making ecstasy less prevalent than a number of other illicit drugs. In 2012 annual use declined significantly for all three grades. The 2013 rates are roughly half the peak rates observed in 2001 for 8th, 10th, and 12th graders, college students and young adults.

L. Johnson, et.al., Univ. of Mich., *Monitoring the Future: National Survey Results on Drug Use 1975-2013* (2013) at 27, *available at* http://monitoringthefuture.org/pubs/monographs/mtf-vol1_2013.pdf.

The Monitoring the Future Survey is also significant for its finding that better education about Ecstasy is the likely explanation for the decline and tapering of MDMA usage among 8th, 10th, and 12th graders, college students and young adults. It found:

> Ecstasy use among all five populations has been moving fairly synchronously since 1999, which suggests a secular trend (some change in events in the social environment) that affected everyone. An important change during this period was the increasing availability of information on the adverse effects of ecstasy use via stories in the popular media, dissemination of the scientific evidence by the National Institute on Drug Abuse, and an anti-ecstasy media campaign by the Partnership for a Drug-Free America and the Office of National Drug Control Policy, initiated in 2002.

Id. at 18.

At the evidentiary hearing in *McCarthy*, Dr. Hanson, the government expert who had been the head of the National Institute on Drug Abuse, embraced the conclusion of the 2009 version of the Monitoring the Future Survey, which also hypothesized that young people became less open to trying MDMA because of their perception of its risk.[42] There is no mention that increased federal prison sentenced deter young people from using MDMA; it is education about the risks of taking drugs that deters its use. While the Commission had valid concerns about the use of MDMA among youth and young adults, these fears of epidemic usage have not materialized. In fact, the use has declined by approximately one-half since 2001, as noted above.

The national experience with MDMA has shown that MDMA does not pose a greater threat to the nation's youth than cocaine does. For example, in the most recent statistics from the Substance Abuse and Mental Health Services Administration ("SAMHSA") show that in 2011, there were a total of 1,252,500 total emergency visits for all reportable illicit drugs. Of this number, 505,244 were emergency room visits for cocaine. The number of emergency room visits for MDMA was only 22,498.[43] The emergency room visits for cocaine, therefore, were over 22 percent higher than those for MDMA.

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[42] McCarthy TR, at 382 (Hanson).

[43] Dept. of Health & Human Srv., SMAHS, *Drug Abuse Warning Network, 2011: National Estimates of Drug-Related Emergency Department Visits*, at table 4, *available at* http://www.samhsa.gov/data/2k13/DAWN2k11ED/DAWN2k11ED.htm.

E. <u>Declaration of Charles S. Grob, M.D.</u>

Dr. Grob is a pediatric psychiatrist who specializes in the research of MDMA and other drugs and serves as director of the Division of Child and Adolescent Psychiatry at Harbor-UCLA Medical Center. Dr. Grob is familiar with the *McCarthy* decision and past and current MDMA research. Indeed, he authored many scholarly articles on the subject and the Commission cited to his research in its report to Congress. *See,* Ecstasy Report, at nt. 4 & 32. Dr. Grob's declaration shows that the findings in *McCarthy* remain valid today.

Dr. Grob concurs with the *McCarthy* conclusion that cocaine is far more harmful than MDMA and merits lesser punishment. He describes cocaine as being highly addictive while MDMA does not cause physiological addiction. He also notes that cocaine is far more likely to precipitate episodes of violence and agitation while MDMA causes "empathetic and expansive states of consciousness." He agrees with the finding of *McCarthy* about the exaggerated concerns of the neurotoxicity of MDMA. Dr. Grob criticizes the earlier MDMA studies that were based on flawed methodology, including over-dosing animal subjects. He states that it is now recognized that the claims that MDMA induced brain damage were grossly overstated.

Dr. Grob further explains that while the recreational use of MDMA has declined in the past decade, researchers have become interested in it for its potential to treat psychiatric disorders. He and his colleagues at Harbor-UCLA are conducting an FDA-approved study to determine if MDMA can be used to treat adults with autism. Other researchers are testing it to treat patients with chronic post-traumatic stress disorder. Grob Declaration, Exhibit A, ¶¶ 15-22.

F. <u>Conclusion on MDMA Guidelines</u>

In sum, the Commission seriously overestimated the harmfulness of MDMA at a time when little reliable information was available about the substance. Because the MDMA guideline is not based on sound empirical evidence, but is instead the product of flawed and repudiated research and assumptions, the sentences recommended by the MDMA guideline do not approximate sentences that are tailored to achieve the sentencing objectives in 18 U.S.C. § 3553(a).

National experience and scientific research in the past 13 years demonstrate that MDMA is less harmful than the Commission and Congress had predicted. The current Ecstasy guideline sentencing ranges are unduly severe. The Commission irrationally found that MDMA was more harmful than powder cocaine. This Court should therefore exercise its discretion under *Kimbrough*, to vary from the scientifically-flawed and unnecessarily harsh MDMA Guideline. Mr. Chong requests that the court reject the 500:1 ratio and replace it with the 50:1 ratio based on the above authority and research.

Even if this Court decides against exercising its "reject and replace" authority, it may still properly incorporate in its analysis of the sentencing factors the various scientific flaws underlying the guidelines and the more accurate and updated data discussed above. In the instant case, the scientific infirmity of the Ecstasy guidelines, when taken in combination with the other arguments presented in Mr. Chong's Sentencing Memorandum re 3553(a) factors, establish that a time-served sentence is warranted for Mr. Chong. A sentence of time served is sufficient, but not greater than necessary, to achieve the statutory purposes of punishment.

G. <u>Establishing a Fair Marijuana Equivalence for Methylone: 10:1 Ratio</u>

Even if this Court finds that MDMA is the most analogous substance, *see* USSG § 2D1.1, application note 6, the significant differences between the drugs are still relevant to sentencing and warrant a far lesser sentence for Methylone.

Indeed, to the extent that the non-listed drug (Methylone) is less potent and presents less of a public health risk than the listed drug (MDMA), the Court should reduce the marijuana equivalency to reflect the diminished potency and danger. *See United States v. Rosse*, 722 F. Supp. 2d 1286, 1291 (M.D. Ala 2010) (granting downward variance for diminished potentcy of BZ-TFMPP as compared to MDMA as part of analysis of nature of the offense); *Quayyem*, 12 WL 92287, *6 (adopting a 200:1 marijuana equivalency for MDMA, finding MDMA to be the most closely related substance to BZ-TFMPP, and ruling variance under section 3553(a) available for consideration); *cf, Spears* 555 U.S. at 265 (recognizing sentencing court's authority to designate replacement marijuana ratio for crack cocaine).

Here, there are significant differences between MDMA and Methylone. In light of these differences, and because Methylone is a far less potent, less harmful drug than MDMA, Mr. Chong requests that this Court apply a 10:1 marijuana equivalency to Methylone. He offers the affidavits of Drs. Dudley, DeCaprio, and Grob in support of this request.

As already discussed thoroughly in Mr. Chong's objections to the PSR, Dr. Dudley has opined that Methylone is more chemically similar to Cathinone than MDMA. Exhibit B. Mr. Chong also discussed Dr. Caprio's opinion, as well as the published literature upon which that opinion is based, that Methylone is only about one-fifth as potent as MDMA.

In addition to those opinions, Mr. Chong offers the declaration of Dr. Charles Grob, M.D. Dr. Grob's opinion provides the Court with a medical view of Methylone. He outlines the history of methylone and other synthetic cathinones, which have been collectively referred to as "bath salts." Exhibit A ¶¶ 7-9. He opines that most individuals who ingest synthetic cathinones tolerate them without evident deleterious effect. However, a small number of adverse outcomes are reported for those who take certain types of synthetic cathinones, *viz*., MDPV and Mephedrone, but not Methylone. *Id*. at ¶ 10.

Dr. Grob explains that public media often report on the dangers of bath salts without distinguishing between various types of cathinones. *Id.* Most analyzed bath salts contained Mephedone and MDPV, which have far greater toxicity than Methylone. According to the DEA, about one-quarter of bath salts analyzed were Methylone. *Id.* Dr. Grob states that Methylone is considered to have "comparatively low toxicity to the central monamine systems when taken alone." *Id.* at ¶12. Indeed, investigators have considered it as a potentially useful treatment for certain forms of depression and attention deficit hyperactivity disorders.

Methylone also presents less of a risk of abuse than other similar drugs. Researchers have noted a comparatively lower level of drug self-administration. It does not lead to escalating drug intake or increased reinforcer efficacy. Based on laboratory studies, Methylone is considered to have a relatively lower potential for abuse than other psychostimulants. *Id.* at 11.

While a number of Methylone users have reported unpleasant or harmful experiences with the drug, most of these negative effects are probably attributable to combining Methylone with other legal and illegal drugs. "Modest dosages of Methylone taken alone, in the absence of other drugs, does not appear to be

particularly hazardous to health." *Id.* at 12. Notwithstanding the wide use of the drug, the DEA reported that, as of 2013, "only three fatalities had been associated with Methylone, and these were likely in the context of polysubstance abuse and excessive dosages." *Id.*

In his Declaration, Dr. Grob also discusses the population that abuses the drug. The frequent media attention given to young adults and teenagers taking "bath salts" at large dance parties likely creates a false impression of widespread abuse of, and addiction to, Methylone among young people. As the Director of a Division of Child and Adolescent Psychiatry at a very large public sector academic medical center for the past 21 years, Dr. Grob is only aware of "a very small number of patients who had presented with Methylone or other synthetic cathinone abuse." *Id.* at 15.

IV.

RESULTING GUIDELINE CALCULATIONS

Based on the foregoing analysis, Mr. Chong was convicted of dealing in about 1.5 grams of Methylone. The appropriate marijuana equivalency ratio for Methylone is 10:1. Applying this ratio, Mr. Chong's base offense level is set by 10.5 grams of marijuana. His base offense level is therefore six. As Mr. Chong has no criminal history, his resulting guideline range is 0-6 months custody.

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Respectfully submitted,

DAVID PATTON
Federal Defender

Dated: July 24, 2014

By ***Chase Scolnick***
CHASE SCOLNICK
Assistant Federal Defender

DECLARATION OF Dr. GREGORY B. DUDLEY, Ph.D.

1. I am over the age of 21.

2. I have personal knowledge of the matters contained within this Declaration.

3. I am an independent consultant specializing in organic chemistry and related fields.

4. I am an Associate Professor and Associate Chair in the Department of Chemistry and Biochemistry at Florida State University.

5. I received a B.A. degree in chemistry from Florida State University in 1995 and a PhD in organic chemistry from Massachusetts Institute of Technology in 2000. I was a postdoctoral research fellow in the Molecular Pharmacology and Chemistry program at the Memorial Sloan-Kettering Cancer Center in New York from 2000 until 2002.

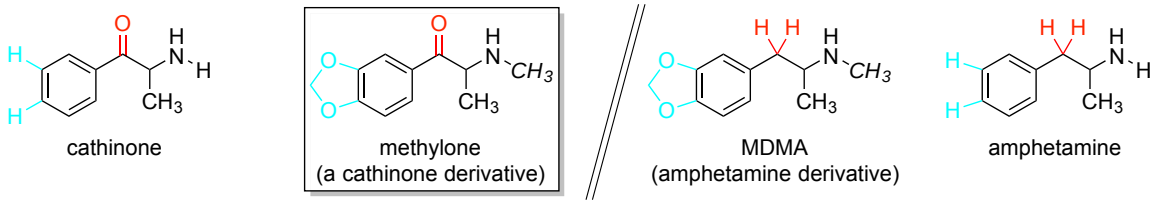
6. I am an organic chemist with professional expertise in synthetic chemistry, chemical structure, molecular interactions, and structure-activity relationships. My primary research focus is on the synthesis of drugs and drug-like compounds. I have published and lectured extensively in these areas, as reflected in my CV, which is attached and referenced in full as Exhibit 1.

7. I have reviewed the chemical structures of methylone, cathinone, and methylenedioxymethamphetamine (MDMA) for the purpose of determining whether methylone is more similar to cathinone or to MDMA.

8. This Declaration is true and accurate to the best of my knowledge and information.

9. It is my expert scientific opinion that methylone more similar in chemical structure to cathinone than it is to MDMA.

10. Simple two-dimensional and color-coded representations of the chemical structures in question are provided in the graphic below.



11. Structurally, methylone is classified as a “cathinone” to indicate that methylone includes the core structure of the substance found naturally in the khat plant, cathinone.

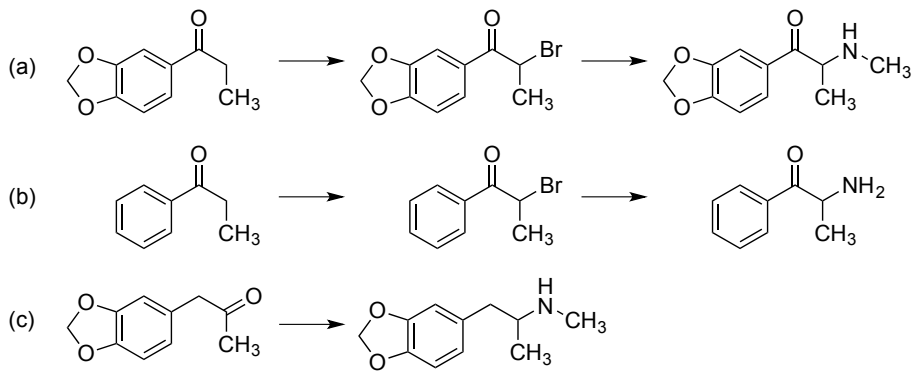
12. In contrast, methylenedioxymethamphetamine (MDMA) is classified as an “amphetamine” because MDMA has the amphetamine core structure.

13. MDMA differs from amphetamine in the same way that methylone differs from cathinone: methyl group on nitrogen (in *italics*) and methylenedioxy fused to the aromatic ring (highlighted in light blue).

14. What distinguishes methylone from MDMA also distinguishes cathinone from amphetamine: the presence or absence of the ketone (highlighted in red).

15. Methylone is a cathinone, so the better comparison is to cathinone rather than the MDMA, which is an amphetamine.

16. Representative pathways for the chemical synthesis of (a) methylone, (b) cathinone, and (c) MDMA are provided in the graphic below.



17. Methylone can be formally described as a chemical derivative of cathinone.

18. Although methylone cannot easily be prepared directly from cathinone, synthesis of methylone and cathinone follow analogous routes (a and b).

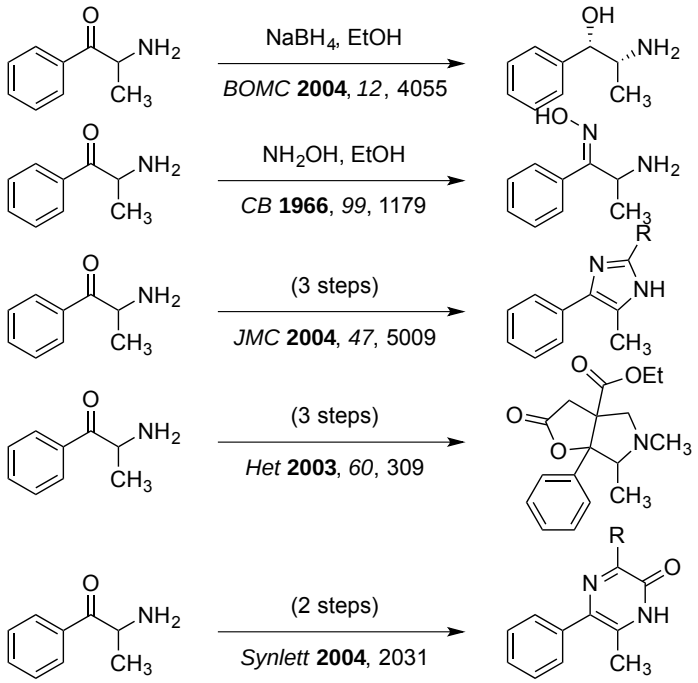
19. The syntheses of cathinone and methylone follow similar paths, whereas the synthesis of MDMA is different.

20. The reason that the synthesis of MDMA is different is because *MDMA is an amphetamine, not a cathinone*.

21. Amphetamines like MDMA lack the ketone (C=O) functionality of the cathinones, so the synthesis is different.

22. The ketone that differentiates cathinones from amphetamines is also responsible for many of the chemical properties of cathinones, as described below.

23. Examples of five chemical transformations of cathinone are presented in the graphic below.



24. In my expert opinion, each of these five transformations would be similarly applicable to methylone *but not to MDMA*.

25. I did not find *any* reactions that in my expert opinion would be applicable to MDMA and to methylone but not to cathinone.

26. The chemical reactivity of cathinones and amphetamines is different.

27. Cathinones and amphetamines both have amines (nitrogen groups), but only cathinones have the ketone (C=O) group, which opens up a much larger set of chemistries.

28. Therefore, I conclude that methylone is more similar in chemical structure to cathinone than it is to MDMA. Methylone *is* a cathinone. Its synthesis and reactivity patterns are those of cathinones, not amphetamines like MDMA.

29. My analysis and opinions regarding the chemical structures and chemical reactivities of methylone, cathinone, and MDMA would be accepted by the scientific community.

I declare under penalty of perjury under the laws of the State of Florida that the foregoing is true and correct.

Executed on June 20, 2014 at Tallahassee, Florida.

GREGORY B. DUDLEY, Ph.D.

DECLARATION OF ANTHONY P. DECAPRIO

I, Anthony P. DeCaprio, declare that the following is true and accurate to the best of my knowledge and if called as a witness I would testify to the following facts and opinions:

1. I am an Associate Professor of Chemistry and Biochemistry and serve as the Director of the Forensic and Analytical Toxicology Facility and the Forensic Science Certificate Program for the International Forensic Research Institute at Florida International University. I received a B.S. degree in biology from Rensselaer Polytechnic Institute in 1975 and a Ph.D. in toxicology from Albany Medical College in 1981. I worked as a research scientist in the area of human toxicology with the New York State Department of Health, Wadsworth Laboratories from 1981 to 1995. Since then, I have served in academic appointments at UAlbany and UMass Amherst prior to joining FIU in 2008.

2. I have 30+ years of professional scientific experience in the fields of chemistry and analysis of drugs, analytical/forensic toxicology, neurotoxicology and neuropharmacology of drugs and chemicals, and biomarkers of drug and chemical exposure. I have published over 75 original research papers in peer-reviewed journals, written several chapters for reference works in toxicology, and edited a book on biomarkers in toxicology. I provide expert peer-review services for numerous journals and funding agencies. I have delivered more than 80 research papers and invited lectures at universities, conferences, and private-sector companies. I am certified as a Diplomate of the American Board of Toxicology and am a full member of the American Chemical Society, International Society for Exposure Science, Society of Forensic Toxicologists, and Society of Toxicology. I regularly teach undergraduate and graduate courses in pharmacology and toxicology of drugs, analytical chemistry, and forensic toxicology. My qualifications and experience are detailed in my curriculum vitae, which is attached.

3. I have performed extensive research on novel psychoactive compounds (also known as “designer drugs”) of the stimulant and synthetic cannabinoid classes.

4. I have been asked to provide my opinions on the neurotoxicology and pharmacological potency of the drug known as “methylone” in relation to MDMA (commonly known as “Ecstasy”).

Mode of Action of Central Nervous System Stimulants:

5. The mode of action (MOA) of most psychoactive central nervous system (CNS) stimulant drugs, including cocaine and certain drugs in the phenethylamine and cathinone class, involves modification of baseline levels of three major neurotransmitter molecules in the brain; dopamine, norepinephrine, and serotonin. Stimulant activity is generally due to increases in the levels of these neurotransmitters in the “synaptic cleft” present between two nerve cells (*i.e.*, the “presynaptic neuron” and the “post-synaptic neuron”). This is where neurotransmission takes place, by means of neurotransmitter molecules being released from the presynaptic neuron to bind with receptors on the post-synaptic neuron to stimulate (or, in some cases, block) a nerve impulse. While this is a highly simplified description of what is in reality a very complex process, the usual result of increased neurotransmitter levels in the synaptic cleft is an increased rate of firing of nerve impulses.

6. There are several cellular mechanisms that can underlie the increase in neurotransmitter levels induced by these drugs. Perhaps the most important involves a drug acting as a substrate and/or blocker of specific transporter proteins that are responsible for moving neurotransmitter molecules from the synaptic cleft back into the presynaptic nerve cell. Without this “reuptake” mechanism, neurotransmitters remain in the cleft and continue to excite the post-synaptic neuron. When operational, the reuptake system serves to limit and control the excitation rate of such neurons, which in turn modifies the activation state of the CNS as a whole.

7. For the three neurotransmitters most relevant to stimulant drugs of abuse, there is a specific transporter molecule present for each, *i.e.*, the dopamine (DAT), norepinephrine

(NET), and serotonin (SERT) transporters, respectively. A drug acting as a transporter "substrate" binds to the transporter and is brought into the nerve cell in preference to the normal neurotransmitter molecule. The effect of this process is to cause inhibition of reuptake and reverse transport of the neurotransmitter out of the cell and into the synaptic cleft. A drug acting as a transporter "blocker" binds to and blocks the movement of the transporter back into the cell, thus also blocking normal neurotransmitter reuptake. Methylone and MDMA are believed to be transporter substrates, while evidence indicates that cocaine is a primarily a transporter blocker.

8. In addition to modifying reuptake of neurotransmitter molecules, certain stimulant drugs can directly induce release of neurotransmitter from the presynaptic nerve terminal. A third MOA involves those drugs that can "mimic" the normal neurotransmitter molecule and directly bind to and activate the specific neurotransmitter receptor on the post-synaptic neuron. In essence, these drugs compete with the normal neurotransmitter to activate the nerve cell.

9. The net result of all three of these possible mechanisms is the same, *i.e.*, elevated levels of neurotransmitters and increased stimulation of post-synaptic nerves.

10. Activation of dopamine, serotonin, and norepinephrine receptors results in different types of psychotropic effects. Dopamine mediates pleasure and reward pathways in the brain; repeated activation of dopaminergic neurons is strongly associated with addictive potential of a drug. High concentrations also induce restlessness and hyperactivity. Serotonin mediates a complex group of CNS responses, including mood, empathic feelings, and, at high concentrations, hallucinogenic activity. Norepinephrine mediates alertness, energy, and physiological parameters such as increased heart rate and blood pressure. The latter are commonly referred to as "sympathomimetic" effects.

11. Direct prediction of the relative pharmacologic activity of stimulant drugs is impossible based on 2D structure alone. Every phenethylamine and cathinone entity has a unique profile for modification of dopamine, norepinephrine, and serotonin activity. These will

in turn mediate the higher CNS effects of each particular drug. Because of the complexity of these interactions, pharmacological activity of a specific drug entity must be experimentally evaluated in *in vitro* ("test tube") models, animal experiments, and, preferably, human studies to provide relevant data.

12. As discussed above, the psychotropic effects of stimulant drugs almost always involve binding with a transporter molecule and/or specific receptors for neurotransmitter molecules in the CNS. In order to assess the ability of prototypical drugs to produce these effects, initial studies often employ measurement of *in vitro* binding affinity with isolated receptors. The ability of a drug to bind to a specific receptor or transporter molecule can be measured by determining the K_i, the "equilibrium dissociation constant". This parameter is defined as the concentration of the drug needed to occupy one-half (50%) of the specific binding sites at equilibrium. The smaller the value of K_i, the higher the affinity of the drug for the receptor. K_i values are often employed in drug development and other biomedical studies to provide some indication of how effectively a drug will (or will not) activate a particular receptor. This may (or may not) be correlated with a specific biologic, pharmacologic, or toxicologic effect.

13. In the case of phenethylamine and cathinone derivatives that cause neurotransmitter release or reuptake inhibition, one can also measure these phenomena in various *in vitro* model systems. The results of these tests are typically expressed as "EC_{50}" or "IC_{50}" values, which represent the concentration of drug needed to cause a 50% increase in the release rate or 50% decrease in the reuptake rate, respectively, of a particular neurotransmitter as compared to control. As with K_i measurements, the higher the activity of the drug in causing neurotransmitter release, the lower the EC_{50} or IC_{50} value.

14. Animal models have also been employed to help predict possible psychoactive effects of drugs in humans. Such models assess behavioral pharmacology endpoints such as locomotor activity, drug discrimination, and drug self-administration responses, in addition to physiological measurements such as body temperature and heart rate. While

offering additional data on the potential CNS activity of candidate drugs, these models all suffer from shortcomings when used to predict similar effects in humans, and therefore are best considered suggestive, but not selective, tools.

15. Pharmacological effects in humans are by their nature nuanced, graded, and variable. A “stimulatory” effect produced by two drugs that, on the surface, appears “similar”, may in fact be due to radically different pharmacological mechanisms. The phrases "pharmacological activity" and "pharmacological effect" are ambiguous and could refer to one of an almost unlimited variety of pharmacological properties. Examples of such properties include binding affinity of drugs to membrane and cytoplasmic receptors, enzymes, transporter molecules, DNA, RNA, or other molecular targets in addition to specific drug effects on liver, renal, CNS, lung, or any of a myriad of specialized cells. Such properties can also refer to functional effects on cognition, physiological parameters such as blood pressure and heart rate, sexual function, appetite, behavior, memory, locomotion, etc.

16. Because of the issues discussed above, the gold standard for assessing human CNS effects of potentially psychoactive drugs is monitoring such effects in humans themselves. This can include controlled experimental studies (*i.e.*, clinical trials) or well-documented case reports. For drugs of abuse, including synthetic cathinones and other derivatives, such data are not generally available. Consequently, prediction of comparative potency and efficacy of such drugs most often relies upon *in vitro* and animal data, a process that inevitably introduces uncertainty into these estimates.

Comparative Pharmacology of Methylone, Cathinone, and MDMA:

17. Methylone is a well-established member of the “novel psychoactive agent” class of drugs, having first been synthesized as a possible anti-Parkinsonism drug and first reportedly used as a recreational drug in 2004. Methylone was emergency scheduled as a Schedule I controlled substance (final order) on October 18, 2012. Methylone acts as

a mixed-action dopamine, serotonin, and norepinephrine transporter substrate, with differing potency for each (see below). Although a few animal studies have been conducted involving methylone and no human clinical trials have been published, a number of case reports have appeared in the literature outlining the CNS activity and toxicity of the compound.

18. MDMA was first synthesized in the early 1900s as a chemical precursor to other related drugs with possible uses to reduce bleeding. Following discovery of its psychoactive properties, the drug became widely used by medical professionals and for recreational purposes in the 1980s. MDMA was first made Schedule I in 1985. Considerable *in vitro*, animal, and human data are available for this drug.

19. A number of published, peer-reviewed *in vitro* and animal studies are available to assess the comparative pharmacological activity of MDMA and methylone. Details of these studies are discussed below.

20. Cozzi et al.[1] examined inhibition of monoamine neurotransmitter uptake by methylone and MDMA in several *in vitro* models. They reported that MDMA was approximately twice as potent as methylone in inhibiting reuptake of dopamine and serotonin and equipotent in inhibiting norepinephrine uptake. They also determined that MDMA was 13-fold more potent than methylone for inhibition of serotonin uptake by the vesicular monoamine transporter, VMAT2, which is a measure of the ability of the neuron to store the neurotransmitter for future release.

21. Nagai et al.[2] reported that MDMA was approximately 2- and 3-fold more potent than methylone in inhibiting dopamine and serotonin reuptake, respectively, into rat brain synaptosomes. They also determined that these drugs were roughly equipotent in norepinephrine reuptake inhibition. Similar relative potencies were noted for neurotransmitter release from synaptosomes.

22. Baumann et al.[3] also using a rat brain synaptosome neurotransmitter release model,

showed that MDMA was approximately 3-, 2.5-, and 5-fold more potent than methylone for inhibition of norepinephrine, dopamine, and serotonin release, respectively. These researchers, using microdialysis techniques, also examined levels of dopamine and serotonin present in the nucleus accumbens (a brain region key to dopamine-based reward stimulation by drugs of abuse) following treatment with various stimulants, including MDMA and methylone. MDMA treatment at either 0.3 mg/kg or 1.0 mg/kg resulted in higher levels of both neurotransmitters in this brain region as compared to the same doses of methylone. Finally, repeated doses of 2.5 or 7.5 mg/kg of MDMA produced higher increases in body temperature in rats as compared to 3 and 10 mg/kg methylone, also consistent with higher potency of MDMA for this physiological endpoint.

23. In a later study, Baumann et al.[4] assessed both neurotransmitter release and reuptake in rat synaptosomes following MDMA and methylone exposure. MDMA and methylone were approximately equipotent for inhibition of dopamine uptake, while MDMA was 3-fold more potent in stimulating dopamine release. For serotonin, MDMA was 8- and 6-fold more potent than methylone for inhibition of reuptake and stimulation of release, respectively. In addition, MDMA exhibited 3- to 4-fold higher potencies for both uptake and release of norepinephrine as compared to methylone.

24. In a very recent study, Eshleman et al.[5] examined a number of neuropharmacological parameters, including transporter binding affinity, for MDMA, methylone, and other cathinones in a series of *in vitro* experiments. They reported that although methylone had a 4-fold higher affinity for the dopamine transporter than MDMA, this cathinone exhibited a lower potency (1.7-fold) for inhibition of dopamine reuptake than MDMA. These data show that transporter binding affinity does not always correlate with functional activity of a drug. In contrast, methylone exhibited both lower affinity (6-fold) for SERT and lower potency for serotonin reuptake inhibition (18-fold) than MDMA. Similar trends were observed for NET affinity and norepinephrine reuptake inhibition with the two drugs. In this study, MDMA was also found to be approximately 2- and 6-fold more potent than methylone for dopamine and serotonin release from

preloaded HEK cells, while both drugs had approximately equal potency for norepinephrine release. MDMA exhibited higher potency than methylone for a number of other relevant endpoints, including inhibition of serotonin uptake and norepinephrine release at VMAT2, in addition to higher affinity for the VMAT2 receptor. Finally, methylone was found to have 4- to 8-fold lower affinity for the three primary human serotonin receptors (*i.e.*, 5-HT_{1A}, 5-HT_{2A}, and 5-HT_{2C}) than methylone.

25. Simmler et al.[6] reported monoamine transporter binding affinity values for MDMA and methylone with trends similar to those found by Eshleman et al. Specifically, methylone affinity was higher for DAT, lower for SERT, and approximately equal for NET as compared to MDMA. However, in contrast to the great majority of other published work, these authors also reported a somewhat higher potency (3.5-fold) for dopamine reuptake inhibition by methylone as compared to MDMA. Comparisons for NET and SERT were similar to other reported data. Interestingly, in the same study, Simmler et al. also noted substantially lower potencies for stimulation of dopamine release (at least 5-fold) and serotonin release (at least 2-fold) from preloaded cells by methylone as compared to MDMA, in agreement with other published findings.

26. A few studies have also reported comparisons between MDMA and methylone in *in vivo* behavioral pharmacology and locomotor activity studies in animal models. Dal Cason et al.[7] assessed stimulus generalization with methylone treatment in rats previously trained to discriminate MDMA from control. Methylone was able to substitute for MDMA in these experiments, but with lower potency and rate of response. Baumann et al.[3] measured locomotor activity (a general measure of CNS stimulation) in rats following injection of the two drugs. MDMA was reported to be substantially more potent than methylone in increasing both horizontal locomotor activity and stereotypic movements. In contrast, López-Arnau et al.[8] reported that MDMA and methylone were roughly equipotent in increasing locomotor activity in mice at a dose of 5 mg/kg. Miyazawa et al.[9]compared the activity of 0.205 mmol/kg doses of methylone and MDMA for 10 functional and observational endpoints in mice. For 8 of the 10 measurements, MDMA was found to produce greater effects than the equal dose of methylone.

27. The bulk of pharmacological evidence presented above supports a conclusion that methylone is, on average, approximately 5-fold less potent than MDMA for a variety of endpoints relevant to the psychoactive effects of this class of drugs of abuse. Similar conclusions regarding a generally lower potency of the cathinone class of stimulant drugs as compared to MDMA have been published.[10,11]

28. In their discussion of the background for methylone scheduling,[12] the DEA states "*Methylone also resembles MDMA in drug discrimination assays. Methylone fully substitutes (>80%) for MDMA in rats trained to discriminate MDMA from saline. Methylone (ED50=6.9 μmol/kg) was about half as potent as MDMA (ED50=3.5 μmol/kg) in these studies.*" It must be noted that the DEA conclusion regarding relative potency of MDMA and methylone is based on a single unpublished contract study that is not available for independent evaluation, in contrast to the more comprehensive consideration of all published pharmacological data, including newer studies, presented above.

Literature Cited:

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DATED this 14th of July 2014.

Anthony P. DeCaprio

ANTHONY P. DeCAPRIO

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CHIN CHONG

UNITED STATES DISTRICT COURT

EASTERN DISTRICT OF NEW YORK

UNITED STATES OF AMERICA, Plaintiff, v. CHIN CHONG, Defendant.	NO. CR 13-CR-570 (JBW) **DEFENDANT'S REPLY TO GOVERNMENT'S SENTENCING MEMORANDUM; EXHIBITS.**

Defendant Ching Chong, by and through his attorney of record, Assistant Federal Defender Chase Scolnick, hereby submits his reply to the government's sentencing memorandum.

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DEFENDANT'S REPLY

A. MR. CHONG WAS ACQUITTED OF ALL CONDUCT INVOLVING THE 500 GRAMS OF METHYLONE SEIZED BY THE GOVERNMENT

In Mr. Chong's opening brief, he argued that, because he was acquitted of all conduct involving the importation of the 500 grams of Methylone seized by the government, he should not be sentenced based on that acquitted conduct. *See* Mr. Chong's Position Re Guidelines ("Pos. Re GL"), pages 12-13. In its reply, the government attempted to minimize the impact of the jury's acquittals on Counts One, Two, and Four by arguing that the conspiracy for which Mr. Chong was convicted in Count Three included the 500 grams of Methylone that the government seized. But the government fails to explain how this is possible, given that Mr. Chong was acquitted of conspiring to possess (Count One), importing (Count Two), and attempting to possess (Count Four) that same package of Methylone. Mr. Chong respectfully requests that this Court reject the government's position and impose a sentence consistent with the jury's verdicts. As explained in Mr. Chong's opening brief, the conspiracy for which he was convicted involved a much smaller quantity—less than five grams—of Methylone.

B. METHYLONE IS MORE "CLOSELY RELATED" TO KHAT/CATHINONE THAN MDMA

1. This Court Should Find That Cathinone Is Incorporated Into The Guidelines' Drug Equivalency Tables

In Mr. Chong's sentencing submission, he argued that Cathinone is a more closely related drug to Methylone than MDMA. In its response, the government objected to this conclusion because Khat, but not Cathinone, is a substance referenced by the guideline.

But the government forgets that selecting the most closely related drug under application note six is not an exact science. *See United States v. Chowdury*, 639 F.3d 583, 586 (2d Cir. 2011). This is a flexible standard that allows the Court significant discretion to apply the appropriate marijuana equivalency ratio. *See id.*

Here, this Court should use its discretion and find that a Khat/Cathinone is the most closely related drug. "Khat" appears in the guidelines under a section entitled "Cocaine and Other Schedule I and II Stimulants (and their immediate precursors)," USSG § 2D1.1, application note 10(D), but Khat itself is not a Schedule I controlled substance. Cathinone, which is the active ingredient in Khat, is a Schedule I controlled substance. It therefore appears that the Commission intended its reference to Khat to apply to Cathinone. Given this application note's ambiguity, this Court should apply the rule of lenity and incorporate Cathinone to fall within this guideline section. Because Khat plants contain, on average, about .1% by weight of Cathinone, this Court can comply with the intent of application note six and accurately apply a marijuana equivalency ratio of 10:1 for Cathinone. *See* Al Motarreb A, Baker K, Broakley KJ. Khat: pharmacological and medical aspects and its social use in Yemen. Phytother Res 2002; 16: 403-13.

2. <u>The Chemical Prong</u>

In Mr. Chong's opening brief, he argued that Methylone was not "substantially similar" in chemical structure to MDMA, and that Cathinone's chemical structure was a better substance of comparison. In its response, the Government disputed Mr. Chong's position and argued that MDMA was in fact more closely related to Methylone. Gov. Pos., pages 11-14. The government's position is premised on treating a ketone as substantially similar to a hydrocarbon. This position is not scientifically valid because

replacing one of these functional groups with the other may result in a very different compound that would never be confused with the original.

The government also attempts to compare the substances chemically by counting atoms. But this technique is not an accepted or valid technique used in organic chemistry. A more accepted practice in is to group substances by their functional components. In nearly every organic chemistry textbook, for example, common chemical groups are divided by chapters, and chapters are typically divided by functional groups or structures. Under this more traditional approach, Cathinone would be a more appropriate drug of comparison to Methylone.

Mr. Chong's position is also consistent with a presentation by the DEA Office of Diversion Control, where it acknowledged the chemical similarities between synthetic cathinones like Methylone and Cathinone. In a DEA presentation regarding synthetic cathinones, for example, the DEA noted that these substances share chemical similarities with both Cathinone and MDMA. Ex. F, page 3.

Finally, the government argues that by the defense expert's logic, Methcathinone would be the drug that is most similar in chemical structure to Methylone. Mr. Chong agrees that Methylone and Methcathinone do share some chemical properties, and that Methylone is more similar to either Methcathinone or Cathinone than it is to MDMA.

3. <u>The Effects of Methylone, Khat/Cathinone, and MDMA</u>

In his sentencing brief, Mr. Chong argued that Methylone, MDMA, and Cathinone are all stimulants of the central nervous system, and that Methylone falls somewhere between MDMA and Cathinone in potency. Pos Re GL, pages 7-11. The government did not offer a complete response to Mr. Chong's position because it only addressed the

similarities between Methylone and MDMA. It did not analyze or discuss any research comparing the effects of Methylone and Khat/Cathinone. Nor does it discuss why MDMA would be a more appropriate drug of comparison than Cathinone.

What research the government does cite to only underscores the need for a more complete analysis that includes Cathinone. For example, the government's expert, and all of the supporting materials it cited, rely heavily on a 1997 *in vivo* study by Dal Cason. *See* Gov. Pos., FN 9. That study showed that Methylone substituted for MDMA in rat drug discrimination models. But, Methylone also substituted for the two other stimulants used in the study, which suggests that the study's methods were not tightly controlled. And importantly, the author of the study suggested that similar tests should be conducted using Cathinone to determine whether it would also substitute for Methylone. Because no such *in vivo* studies comparing the three drugs have been conducted, this study has minimal value in this analysis and it is impossible to determine with certainty whether Methylone is more closely related in effect to Khat/Cathinone or MDMA.

4. <u>The Relative Potencies Of The Substances</u>

The government disputes Mr. Chong's position that Methylone is about 1/5 as potent as MDMA and it argues that the two substances are equipotent. But, the government did not cite to any studies or research to support its position. Nor could it because the government's position here is inconsistent with its own expert's opinion, the research upon which it relies, the apparent position of officials within the department of justice, and at least one other United States Attorney's office.

For example, the government's expert indicated that MDMA is about twice as potent as Methylone in her declaration. Government's Exhibit J, page 2. This finding

is consistent with Dal Cason's study, upon which the government relies. *See* Gov. Resp. FN 9. The defense has also acquired a Department of Justice email instructing United States Attorneys on how to deal with Methylone. According to that Memo,

> DEA ODE states that the potency for Methylone is ½ that of MDMA (meaning Methylone requires twice the quantity to produce the same effects as MDMA), so the Court could adjust the marijuana equivalency accordingly (presumably, 1 gram of Methylone equals 250 grams of marijuana.)

Exhibit D. The defense is also attaching a publicly filed plea agreement from the District of Maryland in which the government took the position that the proper marijuana equivalency of Methylone is 250:1. Exhibit C, page 9 ("According to DEA chemists and pharmacologists, one gram of Methylone is the equivalent of 250 grams of marijuana.").[1]

The government failed to acknowledge this scientific consensus and it argued for a contrary conclusion that Methylone and MDMA are equipotent. In support of this argument the government relied on Mr. Chong's apparent belief that Molly was a pure form of MDMA. It also argued that because the two substances are allegedly equally priced, they must be equally potent. But these argument are factually inaccurate and they seek to exploit the confusion in the drug community regarding the word "molly."

According to the government's expert, "Molly" is a term originally associated with pure MDMA. End users who are purchasing "Molly" believe that they are purchasing

[1] Exhibits C and D were not turned over by the prosecution in this case.

pure MDMA.[2] Drug dealers will typically sell less potent/valuable drugs like Methylone as "Molly" in order to increase their profits. As Agent Miyamoto explained at trial:

Q: Any You've heard the term ["Molly"] as used to describe pure MDMA?

A: That's Correct.

Q: Okay. And it's consistent with your experience that people will sell other drugs as molly?

A: Yes.

Q: Okay. And some of those people are, some of the drugs – some of these people selling the drugs as molly are holding them out to be pure MDMA, right?

A: Yes, that's correct.

Q: And is that because MDMA or pure MDMA would command a higher price?

A: Yes. . . .

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[2] Mr. Chong and his friends were among those confused about the chemical composition of "molly." It is likely that Mr. Chong and his friends never actually purchased or used real MDMA. *See* Gov. Exhibit G, internal page 16 (noting that of the dozens of samples of suspected MDMA seized, 0 contained actual MDMA; all contained some form of Methylone). Thus, that Mr Chong may have used the term "molly" to refer to a substance actually containing Methylone does not suggest a similar potency between the two drugs.

Exhibit E (Agent Miyamoto's Trial Testimony), page 521; *see also* Exhibit B (Agent Miyamoto's Deposition), pages 94-95 ("So I have come across many investigations where a drug trafficker is selling quote/unquote, Molly and purporting it to be pure MDMA but is replacing it with Methylone, yes").

When Methylone is not being marketed as "Molly," it commands a far lesser price. According to the government's expert in this case, a kilogram of pure Methylone can be purchased on line for about $2,100. Exhibit A (Hearing TR: page 70). The wholesale price of Methylone in the United States is therefore about 1/8 the price of MDMA. *See* Gov. Pos., page 17 (indicating that the wholesale price of MDMA is about $17,600 per kilogram). This pricing information confirms Dr. DeCaprio and the DEA's conclusion that MDMA is a far more potent drug than Methylone.

In Sum, Mr. Chong asserts that Khat/Cathinone is the most appropriate drug of comparison for purposes of calculating the marijuana equivalency ratio of Methylone, and the government has not established that a different drug should be used for this calculation. Given the concentration of Cathinone present in Khat, this Court should adopt a 10:1 marijuana equivalency ratio.

C. <u>The Appropriate Marijuana Equivalency For Methylone Is 10:1</u>

Even if this Court agrees with the government that Methylone is most similar to MDMA, it should still reduce Mr. Chong's marijuana equivalency ratio to 10:1. As Mr. Chong argued in his sentencing brief and demonstrated through the testimony of various experts, the MDMA guidelines were based on science that has since been refuted and undermined.

Notwithstanding this body of research that undermines the soundness of the MDMA guidelines, the government argues that the 500:1 marijuana equivalency ratio for MDMA is still correct. But the government has put forth no significant new evidence or research to support this conclusion. There has been no new research supporting the government's conclusion. After hearing similar arguments from the government, and after hearing testimony from multiple government experts, two courts in the Southern District of New York agreed that the Sentencing Commissions fears regarding MDMA, and the science upon which the guideline is based, have been significantly undermined. *See United States v. McCarthy*, 2011 WL 1991146, Casee No. 09-cr-1136 (SDNY 2011); *United States v. Qayyem,* 2012 WL 922887, Case No. 10-cr-19-KMW (SDNY 2012). While the Court in McCarthy found that a 200:1 ratio was appropriate, it advised that a lower ratio may be appropriate in other cases where additional evidence supports that conclusion. *McCarthy*, 2011 WL 1991146. If this Court finds that MDMA is the more appropriate drug of comparison, Mr. Chong seeks to present that additional evidence warranting a 50:1 marijuana equivalency ratio.

After this Court determines the appropriate marijuana equivalency ratio for MDMA, Mr. Chong requests that it then use its authority to apply a fair ratio for Methylone. As explained above, the government does not credibly challenge Mr. Chong's assertion that Methylone is only 1/5 as potent as MDMA. This Court should therefore apply a marijuana equivalency that is 1/5 of that for MDMA.

The government argues that this Court is bound to apply a 500:1 marijuana ratio for Methylone because it did so in co-defendant Singh's case. But it appears that the government did not disclose the DEA's conclusions regarding the lesser potency of Methylone in advance of Chong's hearing to either the Court or defense counsel in that case. It is therefore not surprising that Singh's counsel did not raise this issue at his sentencing. Finally, it would be fundamentally unfair to punish Mr. Chong for co-

defendant Singh's failure to raise an important issue, especially considering that Singh was not aware of the issue.

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Respectfully submitted,

DAVID PATTON
Federal Defender

Dated: August 18, 2014

By ***Chase Scolnick***
CHASE SCOLNICK
Assistant Federal Defender

EXHIBIT A

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF NEW YORK

- - - - - - - - - - - - - - - - - X

UNITED STATES OF AMERICA : 13-CR-570 (JBW)

-against- U.S. Courthouse
:
Brooklyn, New York

CHIN CHONG

Defendant :
January 2, 2014
- - - - - - - - - - - - - - - - - X 11:45 a.m.

BEFORE:
HONORABLE JACK B. WEINSTEIN
United States District Judge

APPEARANCES:

For the Government: LORETTA E. LYNCH
United States Attorney
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BY: NADIA ELIZABETH MOORE
GINA PARLOVECCHIO
Assistant U.S. Attorneys

For the Defendant: FEDERAL DEFENDERS OF NEW YORK, INC.
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Brooklyn, New York 11201
BY: CHASE A. SCOLNICK
JILLIAN TREZZA, Pro Bono

Court Reporter: RONALD E. TOLKIN, RPR, RMR, CRR
Official Court Reporter
225 Cadman Plaza East
Brooklyn, New York 11201
718-613-2647

A

A Yes.
Q How so?
A Usually wrapped in a container or some type of a outer packaging that will mislead whoever is reading the outside packaging.
Q Are you familiar with the phrase "wholesale drug transaction"?
A Yes.
Q What does that mean?
A It's a transaction that takes place that usually involves larger quantities of whatever product it is that you're trying to sell.
Q How is Methylone typically packaged for wholesale transaction?
A Wholesale would be in like a large Ziplock bag or some larger like hermetically sealed type of a bag.
Q What does the term "street value" mean in connection with the sale of a drug?
A Something that's sold, let's say, on a capsule type basis. It's in a club.
Q Is there a difference in pricing for wholesale versus street level sales?
A Yes, there is.
Q What is that difference?
A The dollar amount difference?

Q The relative value of dollar per amount of drug?

THE COURT: Landed in the United States, wholesale, what's the price as of that time. What's the time?

MS. MOORE: Imported in September 2013.

THE COURT: 2013, wholesale price and quantities.

THE WITNESS: Your Honor, I would be hard pressed to give you an exact number for that exact month, for that exact time of year.

THE COURT: About that time.

THE WITNESS: I can tell you that as of today -- as of, actually, yesterday. I talked to my informant, and corroborated his statement by checking the website myself, I can buy a kilogram of Methylone for $2,100.

THE COURT: That's landed in the United States?

THE WITNESS: That is me purchasing it from a source claiming to be coming from China that's shipped to the United States, yes.

THE COURT: How many capsules do you get from a kilogram?

THE WITNESS: I would say -- I think she said approximately 5,000 capsules.

MS. MOORE: From a kilogram?

THE WITNESS: No, no, no. I'm sorry. For 500, that was for 500. That's for half a kilogram. It was approximately 5,000 capsules, depending on if you make it pure

or if you -- you know, if you cut it and add a cut agent to it, you're probably looking at close to 10,000 capsules per kilogram.

THE COURT: 10,000 per kilo?

THE WITNESS: Yes.

THE COURT: So it's normally sold in capsules?

THE WITNESS: Like at a rave or a club, that's traditionally how it's sold.

THE COURT: How much is a capsule sold for?

THE WITNESS: On average, from what my informant tells me as of yesterday, between ten and $20 depending on the person selling it, depending on the purity, whether it's been adulterated or not with a cutting agent.

THE COURT: So 2,000. You've got approximately 100,000, plus, right, if you sell it.

THE WITNESS: I'm assuming the math is correct. Yes, Your Honor.

THE COURT: Okay. It's a good business. Assuming you can get rid of it.

BY MS. MOORE:

Q How many capsules are typically taken in a dose?

A It all depends on the user and on purity of the pill that they're taking, but the range is between one and four, potentially. On average, one to two.

Q What typically happens to Methylone between wholesale and

EXHIBIT B

1 UNITED STATES DISTRICT COURT
2 EASTERN DISTRICT OF NEW YORK
3
4 UNITED STATES OF AMERICA,
5 Plaintiff,
6 v. CASE NO.: 13-CR-570(S-1)(JBW)
7 CHIN CHONG,
8 Defendant.
9 _____/
10
11 DEPOSITION OF: EVAN I. MIYAMOTO
12 TAKEN: Pursuant to Notice
13 TIME: Beginning at 2:00 p.m.
14 Concluding at 4:45 p.m.
15 DATE: Friday, March 21, 2014
16 PLACE: Federal Defender's Office
17 Park Tower Building
18 400 North Tampa Street
19 Suite 2700
20 Tampa, Florida 33602
21 BEFORE: Lynda J. Mills, RPR, RMR, FPR
22 Registered Merit Reporter
23 Notary Public
24 State of Florida at Large
25

A Yes.

Q So sometimes, when they purchased substances from the legal high website, they actually purchased analogues?

A Correct.

Q And --

A Which would be illegal under the Federal Analogue Act, yes.

Q And when they purchased -- an analogue is not itself printed on the list of controlled substances?

A No, analogues would not be, hence, the reason they fall under the Federal Analogue Act.

Q So these are illegal but they are not on the list of controlled substances?

A Exactly.

Q So in those cases you're aware that people have purchased substances held out to be legal highs that have turned out to not be printed on the controlled substances list?

A Right.

Q Okay. Moving on, we have the term *Molly*. You have heard the term Molly before, right?

A I have.

Q Molly is a term that is used to describe synthetic cathinones, correct?

D

A No.

MS. MOORE: Objection to form.

BY MR. SCOLNICK (resuming):

Q Okay. In your 15 or 16 cases have you heard the term Molly used?

A Yes.

Q What has Molly been used to describe in your 15 or 16 cases that you've worked on?

A Pure MDMA.

Q Okay. Have you had Molly -- have you heard of Molly being used to refer to other substances?

A Yes and no. I say that because Molly is specifically a term inherently associated with pure MDMA. What typically happens and what the media tends to do is get information wrong.

So what happens is you will have a drug trafficker selling, quote/unquote, Molly, and in a retail drug network distribution world people associate the word Molly with pure MDMA. What frequently happens is a drug trafficker will replace pure MDMA with Methylone. And as a result of that over the drug trends over the past few years, Methylone has become associated with the word Molly, but it's not actually accurate.

It's based on misconstrued information gathered by street level law enforcement that's kind of

disseminated to the media, and then the media has now, in turn, kind of completely butchered what the word is actual associated with.

Q So if I understand you correct, the media and street level law enforcement have butchered the word Molly?

A Well, I wouldn't say street level law enforcement butchered it but I would say the media butchered it, yes.

Q Okay. If I could have you read page 13. You read page 13 of Exhibit B before. Could you read it again, please, the bottom paragraph?

MS. MOORE: Which page are you on?

MR. SCOLNICK: Thirteen.

A Okay. So I've --

Q If you could --

A -- reread the last paragraph of page 13 of Exhibit B.

Q I'm sorry. You read that paragraph?

A Yes.

Q If you could read the -- and what this paragraph says is that --

A I can read it aloud if you would like.

Q -- the origin, basically the origin of the term Molly referred to MDMA, right; that's basically

what it says?

A Yeah, pure powder form specifically.

Q Okay.

A Pure powder MDMA.

Q Isn't it true that in the past years the term Molly has evolved to include powder chemicals and analogues of MDMA?

A By what class of people? And that's not necessarily true, no. So when it comes to drug traffickers, drug traffickers know Molly as pure MDMA. The rest of the world as a whole, based on incorrect media reports, now associate Methylone with Molly, but it's a completely inaccurate and wrong portrayal. So the two are not synonymous with each other.

The best way I try and explain this to people is that Molly is pure MDMA, but not all Methylone is Molly. Molly is oftentimes misrepresented or sold by replacing Methylone as the misrepresented pure MDMA. Does that make sense?

So Molly is still synonymous with pure MDMA. It has been in the past and it still is today. And I've debriefed drug traffickers who have specifically outright adamantly said Molly is not a cathinone, it's not Methylone, it's pure MDMA, it's pure ecstasy.

Anybody who calls it something else other than

that is inaccurate. They are misusing that term or they are substituting a different substance and then selling it as pure MDMA.

Q Okay. Isn't it true that Joseph Rannazzisi in this statement that you just read -- well, I'm sorry, I don't want to get ahead of you. Please read the first paragraph of page 14.

MS. MOORE: Chase, how much longer do you think you have?

MR. SCOLNICK: Well, if your witness keeps answering yes and no questions with paragraphs, you know, we'll be here all night.

MS. MOORE: Well, if you would maybe ask him questions instead of testifying maybe that wouldn't happen.

MR. SCOLNICK: Okay. So we'll be here a long, a lot longer.

A Okay.

Q Okay. Now, this report from Joseph Rannazzisi noted that, "In the past several years, Molly has evolved to include a variety of powdered chemicals and analogues of MDMA," right?

A Yes.

Q Okay. That statement is true, right?

A Not necessarily, no.

Q Okay. In some instances it is true?

A No, not really. So, again, I can't just answer a simple yes or no question. Sorry, it's just not going to happen.

This is such a broad statement that it does not apply to everybody in the world. This applies to people who are not familiar or well-versed in the world of drug trafficking or not well-versed in the area of synthetic drugs. This term really more applies to people who don't have any understanding of what the stuff is.

Q Okay. So people who aren't veterans in drug trafficking may use the term Molly to refer to something other than MDMA?

A Right, typically people who are not in the no will do that. And it's incorrect, it's not an accurate thing to say.

Q Well, the people -- so the people who are not in the no use the term incorrectly?

A Incorrectly, exactly. Right.

Q But even though they are using it incorrectly, they are incorrectly using the term Molly to refer to other substances, correct?

A Exactly. Incorrectly, yes, using that term, correct.

EXHIBIT C

U.S. Department of Justice

United States Attorney
District of Maryland

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October 10, 2013

Paul D. Hazlehurst, Esquire
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Baltimore, Maryland 21201

FILED ENTERED
LODGED RECEIVED

NOV 05 2013

AT BALTIMORE
CLERK U.S. DISTRICT COURT
DISTRICT OF MARYLAND
BY DEPUTY

Re: United States v. Jacob Theodore George IV,
Criminal Case # CCB-13-0593

Dear Mr. Hazlehurst:

This letter, together with the Sealed Supplement, confirms the plea agreement which has been offered to the Defendant by the United States Attorney's Office for the District of Maryland ("this Office"). If the Defendant accepts this offer, please have him execute it in the spaces provided below. If this offer has not been accepted by **October 25, 2013**, it will be deemed withdrawn. The terms of the agreement are as follows:

Offense of Conviction

1. The Defendant agrees to waive Indictment and plead guilty to a one Count Information, charging him with conspiracy to distribute and possess with intent to distribute controlled substances, in violation of 21 U.S.C. § 846. The Defendant admits that he is, in fact, guilty of that offense and will so advise the Court.

Elements of the Offense

2. The elements of the offense to which the Defendant has agreed to plead guilty, and which the Government would prove if the case went to trial are as follows:

First, that two or more persons agreed to distribute and possess with intent to distribute a mixture or substance containing a detectable amount of a controlled substance,

Second, the defendant knew the essential objective of the conspiracy; and

C

Third, the defendant knowingly and voluntarily involved himself in the conspiracy.

Penalties

3. The maximum sentence provided by statute for the offense to which the Defendant is pleading guilty is as follows: 20 year term of imprisonment, 5 years of supervised release, and $1 million fine. 21 U.S.C . § 841(b)(1)(B)(ii). In addition, the Defendant must pay $100 as a special assessment pursuant to 18 U.S.C. § 3013, which will be due and should be paid at or before the time of sentencing. This Court may also order him to make restitution pursuant to 18 U.S.C. §§ 3663, 3663A, and 3664. If a fine or restitution is imposed, it shall be payable immediately, unless, pursuant to 18 U.S.C. § 3572(d), the Court orders otherwise. The Defendant understands that if he serves a term of imprisonment, is released on supervised release, and then violates the conditions of his supervised release, his supervised release could be revoked - even on the last day of the term - and the Defendant could be returned to custody to serve another period of incarceration and a new term of supervised release. The Defendant understands that the Bureau of Prisons has sole discretion in designating the institution at which the Defendant will serve any term of imprisonment imposed.

Waiver of Rights

4. The Defendant understands that by entering into this agreement, he surrenders certain rights as outlined below:

a. If the Defendant had persisted in his plea of not guilty, he would have had the right to a speedy jury trial with the close assistance of competent counsel. That trial could be conducted by a judge, without a jury, if the Defendant, this Office, and the Court all agreed.

b. The Defendant has the right to have his case presented to a Grand Jury, which would decide whether there is probable cause to return an indictment against him. By agreeing to proceed by way of Information, he is giving up that right, and understands that the charges will be filed by the United States Attorney without the Grand Jury.

c. If the Defendant elected a jury trial, the jury would be composed of twelve individuals selected from the community. Counsel and the Defendant would have the opportunity to challenge prospective jurors who demonstrated bias or who were otherwise unqualified, and would have the opportunity to strike a certain number of jurors peremptorily. All twelve jurors would have to agree unanimously before the Defendant could be found guilty of any count. The jury would be instructed that the Defendant was presumed to be innocent, and that presumption could be overcome only by proof beyond a reasonable doubt.

d. If the Defendant went to trial, the government would have the burden of proving the Defendant guilty beyond a reasonable doubt. The Defendant would have the right to confront and cross-examine the government's witnesses. The Defendant would not have to present any defense witnesses or evidence whatsoever. If the Defendant wanted to call

witnesses in his defense, however, he would have the subpoena power of the Court to compel the witnesses to attend.

e. The Defendant would have the right to testify in his own defense if he so chose, and he would have the right to refuse to testify. If he chose not to testify, the Court could instruct the jury that they could not draw any adverse inference from his decision not to testify.

f. If the Defendant were found guilty after a trial, he would have the right to appeal the verdict and the Court's pretrial and trial decisions on the admissibility of evidence to see if any errors were committed which would require a new trial or dismissal of the charges against him. By pleading guilty, the Defendant knowingly gives up the right to appeal the verdict and the Court's decisions.

g. By pleading guilty, the Defendant will be giving up all of these rights, except the right, under the limited circumstances set forth in the "Waiver of Appeal" paragraph below, to appeal the sentence. By pleading guilty, the Defendant understands that he may have to answer the questions by the Court both about the rights he is giving up and about the facts of his case. Any statements the Defendant makes during such a hearing would not be admissible against him during a trial except in a criminal proceeding for perjury or false statement.

h. If the Court accepts the Defendant's plea of guilty, there will be no further trial or proceeding of any kind, and the Court will find him guilty.

i. By pleading guilty, the Defendant will also be giving up certain valuable civil rights and may be subject to deportation or other loss of immigration status. The Defendant recognizes that if he is not a citizen of the United States, pleading guilty may have consequences with respect to his immigration status. Under federal law, conviction for a broad range of crimes can lead to adverse immigration consequences, including automatic removal from the United States. Removal and other immigration consequences are the subject of a separate proceeding, however, and the Defendant understands that no one, including his attorney or the Court, can predict with certainty the effect of a conviction on immigration status. Defendant nevertheless affirms that he wants to plead guilty regardless of any potential immigration consequences.

Advisory Sentencing Guidelines Apply

5. The Defendant understands that the Court will determine a sentencing guidelines range for this case (henceforth the "advisory guidelines range") pursuant to the Sentencing Reform Act of 1984 at 18 U.S.C. §§ 3551-3742 (excepting 18 U.S.C. §§ 3553(b)(1) and 3742(e)) and 28 U.S.C. §§ 991 through 998. The Defendant further understands that the Court will impose a sentence pursuant to the Sentencing Reform Act, as excised, and must take into account the advisory guidelines range in establishing a reasonable sentence.

Factual and Advisory Guidelines Stipulation

6. This Office and the Defendant understand, agree and stipulate that the facts in the Statement of Facts attached as Exhibit A hereto are true, and that this Office would prove those facts beyond a reasonable doubt, and to the following applicable sentencing guidelines factors:

a. Pursuant to U.S.S.G. § 2D1.1(c)(6), the Defendant's base offense level for the quantity of narcotics at issue is **26.**

b. Pursuant to U.S.S.G. § 2D1.1(b)(7) there is a **2** level enhancement because a controlled substance was distributed through mass-marketing by means of an interactive computer service.

c. This Office does not oppose a two-level reduction in the Defendant's adjusted offense level, based upon the Defendant's apparent prompt recognition and affirmative acceptance of personal responsibility for his criminal conduct. This Office agrees to make a motion pursuant to U.S.S.G. § 3E1.1(b) for an additional one-level decrease in recognition of the Defendant's timely notification of his intention to plead guilty. This Office may oppose any adjustment for acceptance of responsibility if the Defendant (a) fails to admit each and every item in the factual stipulation; (b) denies involvement in the offense; (c) gives conflicting statements about his involvement in the offense; (d) is untruthful with the Court, this Office, or the United States Probation Office; (e) obstructs or attempts to obstruct justice prior to sentencing; (f) engages in any criminal conduct between the date of this agreement and the date of sentencing; or (g) attempts to withdraw his plea of guilty.

Accordingly, the adjusted offense level is **25.**

7. The Defendant understands that there is no agreement as to his criminal history or criminal history category, and that his criminal history could alter his offense level if he is a career offender or if the instant offense was a part of a pattern of criminal conduct from which he derived a substantial portion of his income.

8. This Office and the Defendant agree that with respect to the calculation of the advisory guidelines range, no other offense characteristics, sentencing guidelines factors, potential departures or adjustments set forth in the United States Sentencing Guidelines will be raised or are in dispute, except that the Defendant reserves the right to seek a downward departure un U.S.S.G. § 4A1.3(b), for overrepresentation of criminal history.

9. The parties reserve the right to bring to the Court's attention at the time of sentencing, and the Court will be entitled to consider, all relevant information concerning the Defendant's background, character and conduct. Both parties reserve the right to make their own sentencing recommendation utilizing the factors set forth in 18 U.S.C. § 3553.

Waiver of Appeal

10. In exchange for the concessions made by this Office and the Defendant in this plea agreement, this Office and the Defendant waive their rights to appeal as follows:

a. The Defendant knowingly waives all right, pursuant to 28 U.S.C. § 1291 or otherwise, to appeal the Defendant's conviction;

b. The Defendant and this Office knowingly waive all right, pursuant to 18 U.S.C. § 3742 or otherwise, to appeal whatever sentence is imposed (including the right to appeal any issues that relate to the establishment of the advisory guidelines range, the determination of the defendant's criminal history, the weighing of the sentencing factors, and the decision whether to impose and the calculation of any term of imprisonment, fine, order of forfeiture, order of restitution, and term or condition of supervised release) except as follows: (i) the Defendant reserves the right to appeal any term of imprisonment to the extent that it exceeds the term of imprisonment applicable for the guideline range determined by the Court; (ii) and this Office reserves the right to appeal any term of imprisonment to the extent that it is below the term of imprisonment applicable for the guideline range determined by the Court.

c. Nothing in this agreement shall be construed to prevent the Defendant or this Office from invoking the provisions of Federal Rule of Criminal Procedure 35(a), or from appealing from any decision thereunder, should a sentence be imposed that resulted from arithmetical, technical, or other clear error.

d. The Defendant waives any and all rights under the Freedom of Information Act relating to the investigation and prosecution of the above-captioned matter and agrees not to file any request for documents from this Office or any investigating agency.

Forfeiture

11. The Defendant agrees to forfeit to the United States all of his right, title, and interest in any and all money, property, or assets of any kind, derived from or acquired as a result of, or used to facilitate the commission of, the Defendant's illegal activities.

12. The Defendant agrees to assist fully the United States in the forfeiture of the foregoing assets. The Defendant agrees to take all steps necessary to pass to the United States clear title to these assets, including but not limited to executing any and all documents necessary to transfer his interest in any of the above property to the United States, assisting in bringing any assets located outside the United States within the jurisdiction of the United States, and taking whatever steps are necessary to ensure that assets subject to forfeiture are not sold, disbursed, wasted, hidden or otherwise made unavailable for forfeiture. The Defendant further agrees that he will not assist a third party in asserting a claim to the foregoing assets in an ancillary proceeding.

13. The Defendant knowingly waives all constitutional, legal and equitable defenses to the forfeiture of the foregoing assets. It is further understood that, in the event that the United States files a civil action pursuant to 18 U.S.C. § 981 or 21 U.S.C. § 881 or any law enforcement agency initiates a forfeiture proceeding seeking to forfeit these assets, the Defendant will not file a claim with the Court or agency or otherwise contest such a forfeiture action and will not assist a third party in asserting any such claim. It is further understood that the Defendant will not file or assist anyone in filing a petition for remission or mitigation with the Department of Justice concerning the forfeited assets.

Collection of Financial Obligations

14. The Defendant expressly authorizes the U.S. Attorney's Office to obtain a credit report in order to evaluate the Defendant's ability to satisfy any financial obligation imposed by the Court.

15. In order to facilitate the collection of financial obligations to be imposed in connection with this prosecution, the Defendant agrees to disclose fully all assets in which the Defendant has any interest or over which the Defendant exercises control, directly or indirectly, including those held by a spouse, nominee or other third party.

16. The Defendant will promptly submit a completed financial statement to the United States Attorney's Office, in a form this Office prescribes and as it directs. The Defendant promises that the financial statement and disclosures will be complete, accurate and truthful, and understands that any willful falsehood on the financial statement will be a separate crime and may be punished under 18 U.S.C. § 1001 by an additional five years' incarceration and fine.

Obstruction or Other Violations of Law

17. The Defendant agrees that he will not commit any offense in violation of federal, state or local law between the date of this agreement and his sentencing in this case. In the event that the Defendant (i) engages in conduct after the date of this agreement which would justify a finding of obstruction of justice under U.S.S.G. § 3C1.1, or (ii) fails to accept personal responsibility for his conduct by failing to acknowledge his guilt to the probation officer who prepares the Presentence Report, (iii) moves to withdraw his guilty plea or (iv) commits any offense in violation of federal, state or local law, then this Office will be relieved of its obligations to the Defendant as reflected in this agreement. Specifically, this Office will be free to argue sentencing guidelines factors other than those stipulated in this agreement, and it will also be free to make sentencing recommendations other than those set out in this agreement. As with any alleged breach of this agreement, this Office will bear the burden of convincing the Court of the Defendant's obstructive or unlawful behavior and/or failure to acknowledge personal responsibility by a preponderance of the evidence. The Defendant acknowledges that he may not withdraw his guilty plea because this Office is relieved of its obligations under the agreement pursuant to this paragraph.

Court Not a Party

18. The Defendant expressly understands that the Court is not a party to this agreement. In the federal system, the sentence to be imposed is within the sole discretion of the Court. In particular, the Defendant understands that neither the United States Probation Office nor the Court is bound by the stipulation set forth above, and that the Court will, with the aid of the Presentence Report, determine the facts relevant to sentencing. The Defendant understands that the Court cannot rely exclusively upon the stipulation in ascertaining the factors relevant to the determination of sentence. Rather, in determining the factual basis for the sentence, the Court will consider the stipulation, together with the results of the presentence investigation, and any other relevant information. The Defendant understands that the Court is under no obligation to accept this Office's recommendations, and the Court has the power to impose a sentence up to and including the statutory maximum stated above. The Defendant understands that if the Court ascertains factors different from those contained in the stipulation set forth above, or if the Court should impose any sentence up to the maximum established by statute, the Defendant cannot, for that reason alone, withdraw his guilty plea, and will remain bound to fulfill all of his obligations under this agreement. The Defendant understands that neither the prosecutor, his counsel, nor the Court can make a binding prediction, promise, or representation as to what guidelines range or sentence the Defendant will receive. The Defendant agrees that no one has made such a binding prediction or promise.

Entire Agreement

19. This letter supersedes any prior understandings, promises, or conditions between this Office and the Defendant and, together with the Sealed Supplement, constitutes the complete plea agreement in this case. The Defendant acknowledges that there are no other agreements, promises, undertakings or understandings between the Defendant and this Office other than those set forth in this letter and the Sealed Supplement and none will be entered into unless in writing and signed by all parties.

If the Defendant fully accepts each and every term and condition of this agreement, please sign and have the Defendant sign the original and return it to me promptly.

Very truly yours,

Rod J. Rosenstein
United States Attorney

By: _____
Justin S. Herring
Assistant United States Attorney

I have read this agreement, including the Sealed Supplement. I have carefully reviewed every part of it with my attorney. I understand it, and I voluntarily agree to it. Specifically, I have reviewed the Factual and Advisory Guidelines Stipulation with my attorney, and I do not wish to change any part of it. I am completely satisfied with the representation of my attorney.

10-24-13
Date

Jacob George
Jacob Theodore George IV

I am Jacob Theodore George IV's attorney. I have carefully reviewed every part of this agreement, including the Sealed Supplement. He advises me that he understands and accepts its terms. To my knowledge, his decision to enter into this agreement is an informed and voluntary one.

10-24-13
Date

Paul D. Hazlehurst, Esq.

EXHIBIT A - STIPULATED FACTS

The defendant hereby stipulates and agrees that these facts are true, and that if this case had proceeded to trial, the government would have proven the following facts beyond a reasonable doubt. The parties also stipulate and agree that the following facts do not encompass all of the evidence that would have been presented had this matter proceeded to trial.

The defendant, Jacob Theodore George IV, age 32, was a resident of Edgewood, Maryland. From at least November 2011 to January 18, 2012, he conspired with others to traffic drugs, including heroin, a Schedule I controlled substance and methylone, a Schedule I controlled substance.

The defendant sold drugs via an online marketplace called Silk Road. Silk Road served as an online, international marketplace for users to buy and sell controlled substances, false identifications, and other contraband over the Internet. The defendant made contact with buyers via Silk Road, accepted payment electronically through Silk Road, and shipped drugs via the United States Postal Service to buyers throughout the United States and in foreign countries. The owner and operator of Silk Road, Ross William Ulbricht, a/k/a "Dread Pirate Roberts," a/k/a "DPR," collected a fee for each transaction on the website. The defendant acquired drugs from two primary sources: he purchased some drugs, including heroin, in person from drug dealers in the Baltimore metropolitan area. He purchased certain synthetic drugs, including methylone, from suppliers in China and had those drugs shipped to him.

In January 2012, the defendant voluntarily admitted to federal agents with Homeland Securities Investigations that he acquired and sold drugs as described above. He voluntarily granted investigators access to emails, postal shipping records, financial accounts, and other information that corroborated these sales. The records corroborated his statement that he had received three shipments of methylone from China since November 2011, with a combined quantity totaling more than 570 grams. According to DEA chemists and pharmacologists, one gram of methylone is the equivalent of 250 grams of marijuana. These records also confirmed that the defendant sold at least 50 grams of a mixture or substance containing heroin during his involvement in this conspiracy. Accordingly, the marijuana equivalent of the drugs involved in the offense is 192.5 kilograms of marijuana.

I have read this Statement of Facts and carefully reviewed every part of it with my attorney. I understand it, and I voluntarily agree to it. I do not wish to change any part of it.

11-5-13
Date

Jacob George
Jacob Theodore George IV

I am Jacob Theodore George IV's attorney. I have carefully reviewed every part of this Statement of Facts with him. To my knowledge, his decision to sign is an informed and voluntary one.

11/5/13
Date

Paul D. Hazlehurst, Esquire

EXHIBIT D

Huber, Ron (USAVAW)

From: Sola, Stephen [Stephen.Sola@usdoj.gov]
Sent: Monday, May 21, 2012 12:33 PM
To: Albrecht, Scott A. (DEA-US); Anderson, Jeff (USAWIW); Aravind, Santosh (USANYS); Bolstad, Leah (USAOR); Braun, James (USANM); Clark, Merrill (Wes) (DEA-US); Connelly, Catherine (USAMOW); Craig, Amber (USANV); Duncan, Rob (USAKYE); Evans, Stephanie (USAFLS); Farley, John (USANH); Fellrath, Robert (USAAZ); Freedman, Carla (USANYN); Gerbasi, Joe (CRM); Harding, Robert (USAMD); Huber, Ron (USAVAW); Keller, James (USANV); Levine, Leonard (CRM); Matz, Harry (CRM); McDermott, William T. (Tim) (DEA-US); Phillips, Amy (USAPAM); Saxena, Surya (USAMN); Sini, Timothy (USANYS); Smith, Neil (USATNE); Sola, Stephen (CRM); Svoboda, Nancy (USANE); Wolters, Kenneth W. (DEA-US)
Subject: Sentencing Guidelines for Synthetics
Attachments: ODE Sentencing Guideline Recommendations for Synthetic Cannabinoids & Cathinones, May 16, 2012.pdf

Folks:

DEA's Office of Drug Evaluation (ODE) recently issued guidance on the "most closely related controlled substance" applicable to certain specified synthetic cannabinoids and cathinones (bath salts) for purposes of calculating the marijuana equivalencies under the advisory sentencing guidelines. Due to your interest in synthetics, I am attaching ODE's guidance in pdf format.

ODE has emphasized that these recommendations are preliminary and are based on currently available information and studies, and they will be revised as new information becomes available.

In brief, DEA would be prepared to testify at sentencing that for the synthetic cannabinoids (for the five emergency scheduled synthetic cannabinoids and AM2201), the most closely analogous scheduled drug (based on Sentencing Guideline 2D1.1, Application Note 5, Factor "B" -- Effects) is **THC**, with a **marijuana equivalency of 1 gram THC equals 167 grams of marijuana**, but no determination has been made as to potency.

Further, DEA would be prepared to testify that for the synthetic "bath salts" MDPV and mephedrone, the scheduled drug **methcathinone** (for which there is an established sentencing guideline of **1 gram of methcathinone equals 380 grams of marijuana**) is the most closely analogous drug based on Sentencing Guideline 2D1.1, Application Note 5 Factors "A" (structure) and "B" (effects), but DEA has not taken a position yet with regard to potency.

For methylone, the most closely analogous scheduled drug is **MDMA** based on Factors "A" (chemical structure) and "B" (effects). MDMA has a marijuana equivalency of 1 gram equals 500 grams of marijuana. **However, DEA ODE states that the potency for methylone is ½ that of MDMA** (meaning methylone requires twice the quantity to produce the same effects as MDMA), so the Court could adjust the marijuana equivalency accordingly (presumably, 1 gram of methylone equals 250 grams of marijuana).

I hope this is helpful. Feel free to contact me at (703) 488-4343 if you have any questions.

Sincerely,

Steve Sola

Stephen Sola
Stephen Sola
Special Operations Division

Narcotic and Dangerous Drug Section
U.S. Department of Justice
(703) 488-4343 (phone)
(202) 746-3707 (cell)

ODE provides the following recommendations for the most closely related controlled substances that are referenced in the U.S. Sentencing Guidelines for the three emergency scheduled synthetic cathinones, the five emergency scheduled synthetic cannabinoids, and the synthetic cannabinoid analogue AM2201. Recommendations are preliminary and based on the currently available information and studies, and they will be revised as new data become available.

After considering the three factors in the Sentencing Guideline 2D1.1 Application Note 5, the following is a summary of our recommendations.

*(A) Whether the controlled substance not referenced in this guideline has a **chemical structure** that is substantially similar to a controlled substance referenced in this guideline.*

*(B) Whether the controlled substance not referenced in this guideline has a **stimulant, depressant, or hallucinogenic effect** on the central nervous system that is substantially similar to the stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance referenced in this guideline.*

*(C) Whether a **lesser or greater quantity** of the controlled substance not referenced in this guideline is needed to produce a substantially similar effect on the central nervous system as a controlled substance referenced in this guideline.*

PRELIMINARY	(A)	(B)	(C)
Synthetic Cathinone			
MDPV	methcathinone	methcathinone	to be determined (TBD)
Methylone	MDMA	MDMA	methylone is 1/2 as potent as MDMA
Mephedrone	methcathinone	methcathinone	TBD
Synthetic Cannabinoid			
JWH-018	none	THC	TBD
JWH-073	none	THC	TBD
JWH-200	none	THC	TBD
CP 47,497	none	THC	TBD
CP-47,497; C-8 homologue	none	THC	TBD
AM-2201 (Analogue)	none	THC	TBD

Liqun L. Wong, Chief (Acting)
Drug and Chemical Evaluation Section
Office of Diversion Control | Drug Enforcement Administration
8701 Morrissette Drive, Springfield, VA 22152
202.307.7179(desk), 703.423.7832(BB), 202.353.1263(fax)
Email: liqun.l.wong@usdoj.gov or liqun_wong@yahoo.com

EXHIBIT E

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF NEW YORK

- - - - - - - - - - - - - - X

UNITED STATES OF AMERICA,	: 13-CR-00570(JBW)
-against-	: United States Courthouse : Brooklyn, New York
CHIN CHONG,	: Monday, March 31, 2014 : 9:30 a.m.
Defendant.	

- - - - - - - - - - - - - - X

TRANSCRIPT OF CRIMINAL CAUSE FOR JURY TRIAL
BEFORE THE HONORABLE JACK B. WEINSTEIN
UNITED STATES SENIOR DISTRICT JUDGE

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

For the Government: LORETTA E. LYNCH, ESQ.
United States Attorney
Eastern District of New York
271 Cadman Plaza East
Brooklyn, New York 11201
BY: NADIA ELIZABETH MOORE, ESQ.
GINA MARIE PARLOVECCHIO, ESQ.
Assistant United States Attorney

For the Defendant: FEDERAL DEFENDERS OF NEW YORK
16 Court Street
3rd Floor
Brooklyn, New York 11201
BY: CHASE SCOLNICK, ESQ.
MILDRED M. WHALEN, ESQ.

Court Reporter: VICTORIA A. TORRES BUTLER, CRR
225 Cadman Plaza East
Brooklyn, New York 11201
VButlerRPR@aol.com

Proceedings recorded by mechanical stenography, transcript produced by Computer-Assisted Transcript.

A Okay.
Q Okay. You mentioned on direct examination that you've heard the term "molly," right?
A Yes.
Q And you've heard the term as used to describe pure MDMA?
A That's correct.
Q Okay. And it's consistent with your experience that people will sell other drugs as molly?
A Yes.
Q Okay. And some of those people are, some of the drugs -- some of these people selling the drugs as molly are holding them out to be pure MDMA, right?
A Yes, that's correct.
Q And is that because MDMA or pure MDMA would command a higher price?
A Yes. Not only would pure MDMA command a higher price, but there has been a misconception that pure MDMA is safer than other drugs which is a reason that people tend to go towards that.
Q But "molly" is also used rightly or wrongly to describe a number of other drugs, right?
A Yeah, it's more like a brand association.
Q Okay. The DEA itself has, has explained that "molly" is now used to describe a number of synthetic cathinones, correct?

A Well, so it depends on where or what context. So, again, in the retail distribution side, that specifically is accurate when it comes to, say, convenience store distribution, gas station distribution, smoke shops, head shops. They tend to sell products that are labeled or branded with the word or the association "molly," but it's similar, like I said, brand association.

It's kind of like -- the best way I can equate it to would be like Walmart selling a brand of soda called Dr. P. It would be done so that you understand that it's similar to Dr. Pepper, but it's not really the same. It's just a way to sell the product.

Q Okay. And that's consistent with your experience, right?

A Correct.

Q Now, I want to refer back to Exhibit B which is the Senate report from one of the directors of the DEA. And you've read this before a number of times, right? We've talked about this before a number of times?

A Which one is this?

Q September 2013.

A Okay.

Q Okay. Now, isn't it true that the director of the DEA says in his report to the Senate, and I quote: In the past several years, the term molly has evolved to include a variety of powdered chemicals and analogs of MDMA. Law enforcement

1 authorities have noticed the term frequently used to refer to
2 methylone which was temporarily controlled October 21, 2011,
3 and permanently controlled on April 12, 2013, as well as
4 widely regarded controlled substance analogs such as 4-MEC and
5 alpha-PBP. These designer drugs are synthesized to mimic the
6 effects of MDMA and are currently being sold and distributed
7 under the term molly. The DEA has recently seen
8 multi-kilogram seizures of methylone and other widely regarded
9 controlled substance analogs that are being sold as molly.
10 That's a quote from the DEA director, right?
11 A Yes.
12 Q Okay. Now, since reading this a couple of weeks ago,
13 have you called the DEA director for clarification on this
14 paragraph?
15 A No. I would say that statement is accurate.
16 Q Okay. And you're also aware that the last expert that
17 the government used testified regarding the subject as well,
18 right?
19 A Correct.
20 Q And he testified --
21 MR. SCOLNICK: Can I admit this into evidence, Your
22 Honor, as F? I think we've stipulated it as coming in. The
23 entire hearing testimony.
24 THE COURT: Yes. And that is coming in as what, F?
25 MR. SCOLNICK: Exhibit F.

THE COURT: In evidence by consent.

MS. MOORE: Your Honor, I would object and ask for a brief side bar to discuss.

THE COURT: Yes.

(The following occurred at side bar.)

MS. MOORE: I was of the understanding that the testimony was coming in, but not that he was offering the prior testimony as an exhibit.

THE COURT: It is not going to come in but just used for cross-examination.

MS. MOORE: No, you had already said that the actual testimony could be used at this proceeding. I was not under the impression that he was going to be offering the testimony as an exhibit.

THE COURT: Well, how would he use it, by questioning the witness about it? How would you expect him to use it?

MS. PARLOVECCHIO: By cross-examining the witness, Your Honor.

THE COURT: Going through it, was going to say thus and thus? It seems to me that is an awkward way of pulling it out when we usually go through the same thing anyway.

I will allow it in in redacted form.

MS. MOORE: Well, then, will you allow us to ask him isn't it true that the expert also said, and then read in

other portions that he neglected to include?

THE COURT: Well, were they agreed upon?

MR. SCOLNICK: Yes, Your Honor. The testimony is all coming in so I have no problem with that.

THE COURT: Okay. It is in evidence.

(Side bar ends.)

(In open court.)

THE COURT: F is in evidence by stipulation.

(Defendant's Exhibit F so marked.)

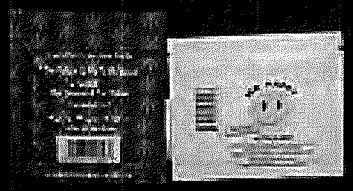
(Continued on next page.)

BY MR. SCOLNICK: (Continuing)
Q I guess we're not going to keep the five-minute promise.
A That's all right.
Q I'm sorry.
So we're clear, we're talking about Exhibit F and this is a transcript from a prior hearing, right?
A I actually -- if you want to display it.
Q Let me show it to you.
A I appreciate it. Okay. Yes. So this is from --
Q The prior hearing.
A Yes, not the depo, right?
Q No.
A That's fine.
Q So I'm pointing out several portions but we're not looking at the whole thing, right?
A I don't know. You tell me.
Q Okay. Let's go through you a couple of pieces here with respect to molly.
Question: So from 2011, I'm sorry, 2012 to today or to last September, "molly" is used pretty broadly, correct?
Answer: That's correct.
It can be used to describe a number of different substances that are synthetic cathinones, correct?
Answer: That is correct.
Question: "Molly" can be used to describe synthetic

1 cathinones and other substances that are not on the list of
2 federally controlled substances, correct?
3 Answer: Essentially, yes.
4 Question: So when someone uses the term "molly,"
5 there is no way to tell from that reference whether they are
6 referring to a substance that's on the list or not on the
7 list, correct?
8 Answer: That is correct.
9 Q Okay. So this is testimony you've reviewed before?
10 A Yes.
11 Q Now, stopping there, this is not the entire transcript,
12 correct?
13 A Yes.
14 Q To be fair, there are other parts of this transcript,
15 right?
16 A Yes.
17 Q And the government can question you about other parts of
18 the transcript on redirect?
19 A Sure.
20 Q Okay. So we're not holding this out to be the whole
21 transcript here and now?
22 A No, just a portion.
23 Q We understand each other?
24 A Yes.
25 Q Okay. Isn't it also true that in New York State, only

EXHIBIT F

Synthetic Drug Trafficking & Abuse Trends



July 13 -14, 2013
Pharmacy Diversion Awareness Conference (PDAC)
Portland, OR.

Alan G. Santos, Associate Deputy Assistant Administrator,
Operations Division, Office of Diversion Control,
U.S. Drug Enforcement Administration

Synthetic Cathinones

U.S. Drug Enforcement Administration / Operations Division / Office of Diversion Control

Synthetic Cathinones

- Structurally and pharmacologically similar to amphetamine, Ecstasy (MDMA), cathinone, and other related substances.
- Are central nervous system (CNS) stimulants and have stimulant and psychoactive properties similar to schedule I and II amphetamine type stimulants.
- Synthetic cathinones are sold in retail stores, on the internet, and in "head shops" as "bath salts", "plant food", or "jewelry cleaner"

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF NEW YORK

- - - - - - - - - - - - - - - - X
UNITED STATES OF AMERICA, : 13-CR-570 (JBW)
:
:
:
-against- : United States Courthouse
: Brooklyn, New York
:
:
:
CHIN CHONG, : Thursday, January 2, 2014
: 10:00 a.m.
Defendant. :
:
- - - - - - - - - - - - - - - - X

TRANSCRIPT OF DEPOSITION TESTIMONY
OF **LOUIS SCHMIDT**

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

For the Government: LORETTA E. LYNCH, ESQ.
United States Attorney
BY: **NADIA MOORE, ESQ.**
GINA PARLOVECCHIO, ESQ.
Assistant United States Attorneys

For the Defendant: FEDERAL DEFENDERS OF NEW YORK
BY: **CHASE SCOLNICK, ESQ.**
JILLIAN TREZZA, Pro Bono

Also Present: JONATHAN PAPLOW, Special Agent

Court Reporter: Mary Agnes Drury, RPR
Telephone: (718) 613-2615
E-mail: Mad78910@yahoo.com

Proceedings recorded by computerized stenography. Transcript produced by Computer-aided Transcription.

1 **LOUIS SCHMIDT**, called by the Defendant, having been first duly
2 sworn by the Notary Public, was examined and testified as
3 follows:
4 EXAMINATION BY
5 MR. SCOLNICK:
6 Q Good morning, Mr. Schmidt.
7 A Good morning.
8 Q Could you please state your full name and spell your
9 last?
10 A Louis Schmidt, S-c-h-m-i-d-t.
11 Q Okay. Mr. Schmidt, we're conducting a deposition this
12 morning. It's important that if you don't understand me or
13 something I say, please tell me so I can rephrase it or
14 explain it better, okay?
15 A Yes.
16 Q Thank you. You realize you're under oath this morning,
17 Mr. Schmidt?
18 A I do.
19 Q You are an officer with the DEA?
20 A I am.
21 Q Are a special agent?
22 A I am.
23 Q How long have you been with the DEA?
24 A Approximately nine years.
25 Q Nine years. In that nine years I'm assuming you've had a

1 lot of on-the-job training?
2 A Yes.
3 Q Before you started working as a DEA agent, I assume you
4 had to have training in courses before you became approved
5 as an agent, correct?
6 A Be more specific, like what?
7 Q You went to Glynco, Georgia?
8 A Excuse me?
9 Q Did you go to Glynco, Georgia?
10 A I did not.
11 Q What training did you have before becoming a DEA agent?
12 A Before being hired by DEA or when I was hired as a DEA
13 agent?
14 Q After you were hired you received training?
15 A I received training, yes.
16 Q And that would be before you were allowed to go out and
17 be an active agent, you had to be trained, correct?
18 A Yes, I did.
19 Q Tell me about that training, please.
20 A I went to Quantico, in Virginia, it was approximately
21 16 weeks.
22 Q And during those 16 weeks you received course training
23 in a variety of different matters, correct?
24 A Yes, I did.
25 Q Most, if not all of them, dealt with narcotics?

1 A Yes.
2 Q You were trained regarding a number of different
3 narcotics, correct?
4 A Yes.
5 Q And you were trained regarding receiving and
6 interpreting intelligence?
7 A Yes.
8 Q You were trained regarding methods of communication
9 with other officers?
10 A Yes.
11 Q You were trained regarding chains of command?
12 A Yes.
13 Q And you were trained regarding receiving information
14 and intelligence?
15 A Yes.
16 Q And you were trained regarding what methods and what
17 types of intelligence may be more reliable than others,
18 correct?
19 A Sorry, say that again?
20 Q You were trained regarding the reliability of certain
21 forms of intelligence, correct?
22 A Yes.
23 Q Now, since you completed this training you were out on
24 the job, you have received additional on-the-job training
25 I'm assuming, correct?

1 A No.
2 Q You haven't received any training from supervisors?
3 A Not -- no. Just for yearly requirement training for
4 updating computer statuses and stuff like that, yes.
5 Q But you also will receive intelligence briefings I'm
6 assuming, correct?
7 A Not regularly, no.
8 Q Are you familiar with policy statements of the DEA?
9 A The policy statements of them?
10 Q Yes.
11 A I'm familiar with the DEA agent's manual, yes.
12 Q Now, you're going to be testifying about synthetic
13 drugs, correct?
14 A Yes.
15 Q You're familiar with synthetic drugs?
16 A I am.
17 Q What is your basis about knowing about synthetic drugs?
18 A I've been working synthetic drugs since 2011.
19 Q Okay. So you've got over a year of training in
20 synthetic drugs?
21 A If that's what you want --
22 Q Let me rephrase it. You've got over a year of
23 experience working with synthetic drugs?
24 A Yes.
25 Q And during the course of this year you have learned a

1 lot about synthetic drugs, correct?
2 A I've learned enough.
3 Q Okay. You've learned information from your personal
4 experience?
5 A Yes, I have.
6 Q You've learned information from other officers?
7 A Yes, I have.
8 Q You've learned information from your superiors that
9 have had more experience with these drugs?
10 A Not necessarily, no.
11 Q Okay. Are you -- well, how many cases have you worked
12 on involving synthetic drugs?
13 A Five.
14 Q Five cases. And of those five cases how many dealt
15 with Methylone?
16 A Two to three. There was a third one that I'm not
17 directly the case agent on, but two of them I'm a case agent
18 on.
19 Q And what were the other synthetic drugs that you were
20 involved with?
21 A It was a variety; MDPV, 4-MEC, Pentylone, Pentedrone,
22 alpha-PVP, alpha-PPP.
23 Q Now, you're naming a number of drugs. Are you saying
24 at least one of these cases involved more than one type of
25 synthetic drugs?

1 A Yes.
2 Q Okay. Now, regarding the type of intelligence that you
3 would consider reliable in your field, certainly briefings
4 from superior officers would be among the types of reliable
5 information that an agent would count on, correct?
6 A In a normal case, yes.
7 Q And being someone who follows and who works on
8 synthetic drugs, in those types of cases you would want to
9 be as familiar as possible with emerging intelligence
10 regarding these types of drugs, correct?
11 A Yes.
12 Q Staying current is very important in your field,
13 correct?
14 A Yes, it is.
15 Q Staying current is very important especially in the
16 field of synthetic drugs, correct?
17 A Yes.
18 Q Because synthetic drugs is an emergent field and things
19 are constantly changing, fair to say?
20 A They are, yes.
21 Q Okay. Now, there's no periodical DEA monthly that
22 tells you about synthetic drugs, correct?
23 A There is not.
24 Q Okay. And, in fact, there is really no periodical that
25 the DEA issues at all to your knowledge, correct?

1 A Not that I'm aware of.
2 Q So instead of a periodical you might rely on formal
3 briefings regarding certain types of drugs, correct?
4 A No.
5 Q You would not rely on formal briefings regarding
6 synthetic drugs?
7 A If I were asked to I would rely on them; but do we have
8 them, no.
9 Q Are you familiar with the recent laws that have passed
10 regarding synthetic drugs?
11 A Federal or state?
12 Q Federal?
13 A I'm familiar, yes.
14 Q There's been several new laws in the last few years
15 regarding synthetic drugs, right?
16 A Yes, there have.
17 Q There were several or multiple synthetic drugs that
18 were named temporarily to the controlled substance list in
19 2011, correct?
20 A That's true, yes.
21 Q Are you familiar with all the drugs are?
22 A Most of them.
23 Q There were some drugs that were temporarily scheduled
24 that you're not familiar with, correct?
25 A True.

1 Q Would you be able to name each and every drug as you're
2 sitting here that was scheduled temporarily in 2011.
3 A If my memory serves me correctly it was UR-144,
4 Methylone. I believe it was the JWH series of cannabinoids.
5 I would also -- I'm going to say maybe Pentedrone or
6 Pentylone, I'm not sure, one of them. But I believe the
7 most important one that I remember, because I was working a
8 case at the time, was Methylone.
9 Q So as you sit here today there may be some that you're
10 not familiar with or you can't remember?
11 A Not at this moment I cannot. I know where I have
12 access to that information. If I were ever to do a case, I
13 would reference the CSA, and I would find out what
14 substances were put on there.
15 Q If you were to receive a new synthetic drug case and it
16 was involving a substance you hadn't dealt with before, you
17 would consult the Controlled Substance Act?
18 A I would.
19 Q And that would be the way to determine whether one of
20 the synthetic substances was on the list, correct?
21 A I would. And I would also consult with our chief
22 counsel as well.
23 Q Okay. You would consult the other resources because
24 you haven't personally memorized all of the synthetic drugs
25 out there?

1 A No. It's -- no, it's very hard. There is a lot of
2 synthetics.
3 Q And are you familiar with how many synthetic drugs
4 there are that have been found in the United States?
5 A I have no idea.
6 Q Have you been briefed on it at any point?
7 A No, I have not.
8 Q Okay. You're familiar with how synthetic drugs are
9 sold and marketed correct?
10 A Yes.
11 Q And that's from your own experience?
12 A Yes, it is.
13 Q And it's also from speaking with other officers and
14 reviewing intelligence I assume, correct?
15 A Yes, it is.
16 Q These products are sold under a variety of names,
17 correct?
18 A It's true.
19 Q Maybe they're sold as bath salts, correct?
20 A Yes.
21 Q Plant food?
22 A Yes.
23 Q And a number of other names?
24 A Yes.
25 Q Fair to say that the manufacturers who market these

1 drugs are dishonest in the way they are sold and marketed?
2 A Not true.
3 Q Okay. Manufacturers who market and sell these products
4 don't typically list all the ingredients?
5 A That is a semi-true statement. It's not totally
6 factual, no.
7 Q Okay. Do you remember -- well, okay.
8 Could I refer you to -- if you could open that
9 book up please in front of you, and that would be to
10 Exhibit 1 -- or A.
11 Now, this is a statement from Joseph --
12 A Rannazzisi.
13 Q You've heard of this man?
14 A I have.
15 Q He is a directing official at the DEA, correct?
16 A He is, yes.
17 Q You know him to be someone with authority in your
18 organization?
19 A Yes.
20 Q By virtue of his position, he is someone who is briefed
21 on intelligence from around the country, correct?
22 A Yes, he is.
23 Q He's someone who is in the know, correct?
24 A Yes, he is.
25 Q Someone who is in the know regarding synthetic drugs,

1 correct?
2 A Yes, he is.
3 Q And now, you're someone who works on synthetic drugs?
4 A Yes, I am.
5 Q His statements to you personally or in any publication
6 might be something you would consult when you work on a
7 synthetic drugs case?
8 A Yes.
9 Q Okay. In fact, it would be a useful source of
10 information for you, correct?
11 A Possibly.
12 Q Well, if his statements or information involves
13 substances or cases that you're working on, this would be
14 something that you could rely on, correct?
15 A One of.
16 Q Okay. This -- Mr. Rannazzisi's statements or
17 information are one of the things that you would rely on
18 when you're working on cases, correct?
19 A Possibly, yes.
20 Q And that's because, as we said earlier, he has
21 information from probably around the country, agents around
22 the country, correct?
23 A That's true.
24 Q He is in possession of more information than you are,
25 correct?

1 A He is.
2 Q You've worked on four or five of these cases, correct?
3 A I have.
4 Q And agents in other parts of the country have also
5 worked on a number of these cases, correct?
6 A They have.
7 Q He is someone who would be -- when I say "he"
8 Mr. Rannazzisi is someone who would have more information
9 nationally than you would based on your own experience,
10 correct?
11 A That is true.
12 Q Regarding these drugs?
13 A Yes, that is true.
14 Q And regarding merging trends with these drugs, correct?
15 A That is true, yes.
16 Q Now, if I can have you turn to Mr. Rannazzisi's
17 statement to -- and we're dealing with A -- to page two, I'm
18 sorry, the bottom of page one. If you could read the last
19 sentence in the last line of the bottom of page one?
20 A Starting at "the manufacturers and retailers?"
21 Q Yes.
22 A "The manufacturers and retailers who make and sell
23 these products do not fully disclose all of the product
24 ingredients and never disclose the active and potentially
25 harmful ingredients."

1 Q And these are statements from your -- from one of the
2 directors of DEA, correct?
3 A Yes, it is.
4 Q And these are regarding synthetic drugs?
5 A Yes, I'm assuming it is.
6 Q Okay. Well, if you could look at the title on the
7 cover of this page?
8 A Yes. Oh, yes, right here, "Dangerous synthetic
9 cannabinoids and stimulants."
10 Q So these statements are referring to synthetic drugs,
11 correct?
12 A Yes, they are.
13 Q Okay. Do you have reason to believe that you're
14 directing official with the DEA is wrong about this
15 information?
16 A Not wrong, but I believe old information. That's 2011.
17 It's 2000 going into 2014, the trends change so quickly. At
18 the time it was produced, I believe it was -- the
19 information was given and referred to since 2009, so he may
20 have been going off of old information that was out there.
21 Q Okay. If we could turn to Exhibit D, please. This is
22 another statement from Mr. Rannazzisi, correct?
23 A Yes.
24 Q This appears to be a more current statement, correct?
25 A Yes.

1 Q This in fact was given on, let's see, September of this
2 year? Last year, excuse me, it's 2014 now, but this was
3 given in 2013?
4 A That's what it says on the paper, yes.
5 Q Okay. September of 2013 would be pretty current,
6 correct?
7 A Yes.
8 Q September 25th of 2013 is only a couple of -- few
9 months ago, correct?
10 A Yes, it is.
11 Q Now, if we could look into this, on page five there's a
12 statement in the first paragraph about, let's see, one, two,
13 three, if you could read the fourth line down, the sentence
14 starting with "the manufacturers"?
15 A "The manufacturers and retailers who make and sell
16 these products do not disclose all the product ingredients,
17 including the active and potentially harmful ingredients."
18 Q Okay. You've read that current statement. Do you have
19 reason to believe that the directing, one of the directing
20 officials of the DEA is giving false information?
21 A No, I don't.
22 Q These statements are consistent with your understanding
23 as well, correct?
24 A To a point, yes.
25 Q So, to a point, the people who manufacture these

1 substances aren't always truthful, correct?
2 A No, that's not been my experience. They have
3 disclosed.
4 Q Well, you're saying that every case you've worked the
5 manufacturers disclosed that this was on the controlled
6 substance list?
7 A No. I believe my statement was that there have been
8 cases where they have disclosed and they have been truthful
9 and it has been corroborated that the were truthful and it
10 was in fact what it was in the package.
11 Q So you've worked on five cases. Of those five cases,
12 how many of the five manufacturers disclosed that they were
13 selling a controlled substance?
14 A One.
15 Q One of the five disclosed they were selling a
16 controlled substance?
17 A Yes.
18 Q The other four did not--
19 A I'm sorry. I misunderstood what you said, you're
20 talking very fast; not that he was distributing a controlled
21 substance, was he selling me what the product was that I was
22 asking for which was, at the time, either a controlled drug
23 or an analog of a controlled substance.
24 Q Well, was it an analog of a controlled substance or was
25 it a controlled substance itself?

1 A There were times that I was purchasing an analog and
2 there was times when the product was going to be an actual
3 controlled substance.
4 Q Okay. And you're talking about one specific case?
5 A Yes.
6 Q Well, first, let's talk about the other four cases that
7 you worked on?
8 A Okay.
9 Q In those four cases, did the manufacturer disclose that
10 he was selling a controlled substance?
11 A The manufacturer or the retailer? Because I don't know
12 the manufacturer, I don't know, there was -- the other four
13 cases were retail establishments and the retailer did in
14 fact disclose, yes, this is illegal stuff.
15 Q This was in the United States?
16 A It was in the United States.
17 Q The four retailers were in the United States?
18 A Yes, they were.
19 Q And of those four, each one disclosed they were selling
20 a controlled substance?
21 A You keep using this word "controlled substance" and
22 that's not what they said, they said it is the illegal
23 stuff.
24 Q So they did not disclose to you that they were selling
25 a quote, controlled substance?

A No.
Q Their quote to you, in each of those four cases is: We are selling you the illegal stuff?
A I see what you're trying to pigeonhole me into saying here and I'm not going to concur with that statement. What I'm saying was that it was the general theme of the other retail establishments that what was being sold had a similar effect to an illegal substance or was quote, an illegal substance.
Q Okay. Well, I don't want to pigeonhole you in anything, I want to be fair, but I want to be specific as well. So let's talk about the four cases.
A Yes.
Q Okay. Let's talk about the first case in your head for example.
A All right.
Q That was the in United States?
A It was.
Q Okay. First, as you said, they didn't use the words "controlled substance"?
A No, they did not.
Q Did they use the words, "this is the illegal stuff"?
A No. What they said was, if you want to refer to the first case when I was doing undercover myself, I walked in and they said "this stuff is like cocaine." So my

1 assumption as a federal agent is cocaine is illegal; and
2 therefore, they're comparing the substance to an illegal
3 substance which is cocaine.
4 Q But they didn't specifically tell you that this was
5 illegal in the first place?
6 A No, they did not.
7 Q They said this substance had similar effects to
8 cocaine?
9 A Yes, this is like cocaine.
10 Q But they didn't tell you it was cocaine?
11 A No, they did not.
12 Q And just so we're clear, they didn't actually tell you
13 the substance is going to violate the law?
14 A No. They skirted around it saying that although it --
15 although it is potentially illegally, that you can get
16 around it, that there's no urinalysis test for it, there is
17 nothing that would show up in your body to ever show that
18 there is this substance in your body.
19 Q They said it was potentially illegal?
20 A Yes.
21 Q What context was it said in?
22 A It was said in the fact that there was a lot of
23 attention being drawn to -- which this particular chemical
24 was MDPV, and New York State had passed the -- I believe it
25 was a like a health code violation that you weren't allowed

1 to have MDPV. So a lot of the stuff, they were, like,
2 putting it behind the counter, and in order for you to get
3 it, you had to be a current customer. So it was on the
4 cusp, it wasn't theoretically illegal; but yet, there was
5 knowledge of the retailer that there was the potential for
6 it to be illegal.
7 Q But at this point what was the substance, MDPV?
8 A Yes.
9 Q Was it on the controlled substance list at that point?
10 A It was not, no.
11 Q Second case, were you specifically told that the
12 substance was a quote, controlled substance?
13 A No. And just to be sure and to save ourself some time
14 here, in no case was it ever said to anyone, myself or an
15 informant or undercover that it was a controlled substance.
16 Q Thank you. Let's go back to the first case. Were you
17 told specifically that the chemical substance contained
18 MDPV?
19 A No.
20 Q Okay. So in the first case -- okay. Strike that.
21 Second case; what was the substance at issue?
22 A The second case was a variety of different substances.
23 Q Okay.
24 A Pentylone, I believe Pentedrone and alpha-PVP.
25 Q Were any of the substances involved in the second case

1 controlled at the point they were being sold?
2 A No, they were not.
3 Q Okay. Did the retailer disclose to you the true
4 ingredients involved in the substances?
5 A No.
6 Q Okay. Third case?
7 A Third case was Pentylone and alpha-PVP.
8 Q Those are now controlled substances?
9 A I don't believe so. I'm not sure. I'd have to
10 reference the CSA.
11 Q Okay. As you sit here now, you're not sure as to which
12 synthetic cathinones are on the controlled list and which
13 aren't on the controlled list?
14 A I do know that the ones that I worked, yes, I know that
15 MDPV is and I know Methylone is and those are the two bigger
16 ones. And the one I'm working on currently is a Methylone
17 case and I know that yes, it is on the controlled substance
18 list, yes.
19 Q Again, as you sit here today, you don't know each and
20 every -- what the legal status of each and every synthetic
21 cathinone is?
22 A No, I do not. I know the reference to get it.
23 Q Right. And that would be the Controlled Substance Act?
24 A Yes.
25 Q The third case, did you tell me what the substances

1 were that were involved?
2 A It was synthetic cannabinoids.
3 Q And were you -- okay. You already said in this case
4 with all others, you weren't specifically told this was a
5 controlled substance?
6 A We were not. We were told that it mimics the effects
7 of a controlled substance.
8 Q And were you told the true ingredients that were
9 involved in that substance?
10 A No.
11 Q The ingredients you mentioned earlier, and I don't want
12 to have to repeat them because there were two or three
13 substances that you said were involved in the synthetic
14 cannabinoids, correct?
15 A In the cathinones, yes.
16 Q Now we're talking about a third case?
17 A Oh, yes. The cannabinoids, yes.
18 Q So in the third case none of those two or three
19 substances were disclosed to you, correct?
20 A No.
21 Q All right. Let's go to the fourth case.
22 A It was synthetic cathinones.
23 Q Do you remember which ones were at issue?
24 A I believe it was 4-MEC.
25 Q 4-MEC?

1 A 4-MEC.
2 Q And at the time this was sold it was a controlled
3 substance?
4 A No, not that I'm aware of, it was an analog.
5 Q And was it disclosed to you that the products you were
6 buying contained 4-MEC?
7 A No, it was not.
8 Q What were you told you were buying?
9 A What we were asking for; bath salts, Molly, any of the
10 other substances that the informant would go in and ask for.
11 The informant knew the words to use to get the product.
12 Q But the informant would use these words like "Molly"
13 and "bath salts", words like that, correct?
14 A Yes, they were.
15 Q The informant wouldn't actually use words from a
16 controlled substance list?
17 A No, they would not.
18 Q Okay. So we went through four cases in the United
19 States?
20 A Yes.
21 Q And of those four cases no one told you that you were
22 buying a controlled substance, specifically in those words?
23 A No. Not specifically, no.
24 Q And of those four cases, no one disclosed to you that
25 you were buying the specific -- strike that.

1 No one disclosed to you in those four cases that
2 you worked on domestically the true ingredients that you
3 were buying?
4 A That's true.
5 MS. MOORE: I'm going to object. Could you just
6 establish a timeline for when any of these things were
7 happening in his testimony.
8 Q These four or five cases that we're talking about with
9 synthetic drugs, could you please give me a timeline for
10 when we're talking about here?
11 A From 2011 until currently.
12 Q Okay. So during these four cases in last two years or
13 so that you worked on domestically, no one disclosed to you
14 the true ingredients that you were buying?
15 A No. Not domestically, no.
16 Q All right. Now, on the international case -- well,
17 first of all, let me take a step back. The four domestic
18 cases you looked at the packaging of these products?
19 A Yes, I did.
20 Q They were sold somewhat out in the open, either under a
21 counter or in a sales exhibit, correct, in a store?
22 A For awhile, yes.
23 Q Okay. And the packaging itself did not disclose the
24 harmful ingredients, correct?
25 A No, it did not.

1 Q The packaging itself did not disclose that these items
2 contained unlawful goods?
3 A No, it did not.
4 Q At points some of these packages will say that they
5 were like an illegal substance, correct?
6 A Yes.
7 Q And the retailers will say it's like an illegal
8 substance?
9 A Yes.
10 Q But they don't specifically say they're illegal?
11 A That is true.
12 Q In fact, they'll say sometimes they're legal highs,
13 correct?
14 A Yes.
15 Q When buying these substances there is no way to
16 determine what's really inside them, right?
17 A True.
18 Q Because the manufacturers, or in some cases the
19 retailers don't always disclose the true substance they're
20 selling?
21 MS. MOORE: Objection to form.
22 MR. SCOLNICK: Okay.
23 Q You can't tell what's inside these substances because
24 the manufacturers and/or retailers don't always disclose?
25 MS. MOORE: Objection to form.

1 Q Don't always disclose the substance within them?
2 MS. MOORE: Objection to form.
3 MR. SCOLNICK: You can answer. It's a deposition.
4 MS. PARLOVECCHIO: You can object during a
5 deposition.
6 MR. SCOLNICK: Yeah. But he still has to answer.
7 Would you like me to repeat the question?
8 THE WITNESS: Please.
9 Q A person wouldn't know what they are purchasing with
10 respect to these synthetic drugs because the manufacturers
11 and/or the retailers don't always disclose the true
12 ingredients?
13 A True.
14 Q Okay.
15 A Domestically. You asked me for my domestic cases, yes.
16 Q Okay. Internationally you've only worked on one
17 international case, correct?
18 A Yes.
19 Q And in that international case you were -- you
20 contacted someone abroad and tried to buy this synthetic
21 drug?
22 MS. MOORE: Objection to form.
23 Q I'm sorry, let me rephrase so we're clear. Tell me
24 about the international synthetic case?
25 A Yes. We established a source of supply in China that

1 we sort of became friends with.
2 Q Okay. Well, tell me about that. Did you -- how did
3 you find the source, was it on the internet that you found
4 it?
5 A It was, yes.
6 Q Now, let's talk about internet site first. They were
7 offering for sale synthetic drugs, correct?
8 A Among other things, yes.
9 Q What were the other things they were offering?
10 A General commerce.
11 Q Goods?
12 A Goods.
13 Q Vitamins and things like that?
14 A Sneakers.
15 Q Okay. And one of the things they were selling was --
16 was it called Molly?
17 MS. MOORE: Objection to form.
18 Q Was one of the things they were selling called Molly?
19 A Not the name Molly, no.
20 Q What was the name they were selling?
21 A The chemical name.
22 Q Methylone?
23 A Methylone, MDPV, 4-MEC, just chemical names.
24 Q And did you directly order the substance?
25 A Not. If you're asking if I order the Methylone, no.

1 Q What did you order?
2 A We ordered STS-135. We ordered AH-7921. We ordered --
3 I'm trying to think what else. I can't remember what else
4 we ordered now.
5 Q So you ordered synthetic --
6 A We ordered synthetic cannabinoids and synthetic
7 cathinones and we ordered a synthetic opiate which was
8 supposed to be the AH-7921.
9 Q Were any of those substances on the controlled
10 substance list when you ordered them?
11 A No.
12 Q Did you successfully order these products?
13 A Yes, except for the last one.
14 Q And after you ordered these products did you test them?
15 A Yes, we did.
16 Q Did they test consistently with what you ordered?
17 A The first few times it did and last time it didn't.
18 Q I'm sorry?
19 A The first few times they did, and last time they
20 didn't.
21 Q So you probably ordered about four different times it
22 sounds like?
23 A I believe it was four times, yes. I can't really be
24 sure, because we went back and forth so many times, I don't
25 remember the exact ones that we actually ordered.

1 Q And three of the four times the substances tested
2 consistently with what you ordered?
3 A Yes.
4 Q But again, at the time you ordered these substances,
5 they were not on the controlled substance list?
6 A No, they were analogs.
7 Q Why didn't you order Methylone?
8 A We were trying to get ahead of the trend.
9 Q And the trend you're talking about is the emerging --
10 MS. MOORE: I'm going to object. Could you
11 establish a timeline again for what he's testifying about.
12 Q We're testifying about your experience, right?
13 A Yes.
14 Q Which is the last two or three years?
15 A From 2011, yes.
16 MS. MOORE: But you're questioning him about
17 particular purchases and particular -- when things were on
18 the controlled substance list, so if you could establish a
19 timeline.
20 MR. SCOLNICK: Okay.
21 Q Well, you said when you ordered these things
22 internationally these things were not on the controlled
23 substance list, right?
24 A No.
25 Q When was that?

1 A This was from 2011 until now.
2 Q That one case has been on-going?
3 A Yes, it has.
4 Q When you said you're trying to stay ahead of the curve,
5 what did you mean?
6 A We were asking our source supply in China what's the
7 next best thing that's out, what's the thing that we need to
8 be ahead of everybody else to put out there on the street.
9 Q Okay.
10 A And he would refer us to a certain chemical.
11 Q All right.
12 A Methylone was already out and already known, it wasn't
13 going to do us any good.
14 Q And also, it was already on the controlled substance
15 list at -- during --
16 A More recently, yes.
17 Q Well, starting in October of 2011 it was temporarily
18 banned, right?
19 A Right, temporarily, and then it was permanently
20 scheduled, yes.
21 Q And so when you're trying to stay ahead of the next
22 trend, what you mean is perhaps switching to something
23 that's not yet on the controlled substance list?
24 A True.
25 Q And this trend is consistent with your experience

1 dealing with these international manufacturers, right?
2 A Trend of what?
3 Q Let me explain that better. These individuals will
4 sell substance "X" we'll call it, right?
5 A Okay.
6 Q Let's assume at that time substance "X" is not
7 controlled in the United States.
8 A Okay.
9 Q Once substance "X" is banned and the word gets out that
10 it's banned, these manufacturers will often switch to a new
11 drug that's chemically similar to substance "X", right?
12 A That is true.
13 Q And one of the reasons they do this is to get around
14 the Controlled Substance Act?
15 A Amongst other --
16 MS. MOORE: I'm going to object. You want to put
17 questions to him instead of kind of testifying, I would
18 appreciate it.
19 Q One of the reasons they do this is so they can get
20 around the Controlled Substances Act?
21 A Amongst other things, yes.
22 Q And they get around the Controlled Substances Act by
23 selling something that is not listed, correct?
24 A That is true.
25 Q Okay. Do you have any idea how many synthetic

1 cathinones were found in the United States in 2012?
2 A I do not.
3 Q Okay. Could I have you turn to the same exhibit, page
4 four?
5 A Exhibit?
6 Q You're at?
7 A D?
8 Q The 2013 exhibit, which is Exhibit D, right.
9 A D, right?
10 Q Correct.
11 A Okay.
12 Q Refer to the first full paragraph. Are you familiar
13 with the National Forensic Laboratory Information System?
14 A I am not.
15 Q Have you been informed regarding the statistics from
16 this or any other federal department regarding synthetic
17 cathinones?
18 A I have not.
19 Q If you refer to that second paragraph, the first full
20 paragraph, there is a -- let's see, it would be one, two,
21 three, four, the fifth line from the bottom and it starts on
22 the right with the sentence with "synthetic cathinones".
23 A Yes.
24 Q If you could read that sentence, please?
25 A "Synthetic cathinones were not as popular as synthetic

1 cannabinoids with 14,100 reports representing 31 different
2 cathinones."
3 Q So according to your director there are 31 different
4 cathinones discovered in the United States in 2012. Is that
5 consistent with your understanding?
6 A I'm not sure. I haven't read the rest of the context
7 of the paragraph to see what he's referring to. But what
8 I'm reading here is it's representing 31 different
9 cathinones. He's not making a statement that there are 31
10 different cathinones. There could be more, but they're just
11 saying this is representing 31 different ones.
12 Q Okay. And we're going to be giving another exhibit for
13 this next one. Can I have you refer to, let's see,
14 Exhibit E?
15 MS. MOORE: Before you question him, I'm going to
16 ask for a chance to review it.
17 MR. SCOLNICK: Okay.
18 Q And we're just discussing the first page. Do you see
19 Exhibit E?
20 A I do.
21 Q This appear to be the marketing of Molly's plant food?
22 MS. MOORE: Objection to form.
23 MR. SCOLNICK: Correct?
24 MS. MOORE: You can go ahead.
25 A Yes. It appears to be, I don't know, it's a picture.

1 Q You've heard of Molly's plant food, correct?
2 A I have not.
3 Q You've heard of Molly, right?
4 A I have heard of Molly, yes.
5 Q And you said that synthetic cathinones can be referred
6 to as plant food?
7 A Among other things, yes. Well, it can be referred to
8 as Molly's, yes, or plant food, yes.
9 Q So you have never heard of this specific product,
10 correct?
11 A I have not.
12 Q And looking at this page itself, this appears to be a
13 page from Amazon.com; is that correct?
14 A That's what it says at the top, yes.
15 Q Now, based on this first page here, there's no way to
16 tell what ingredients you're actually purchasing, correct?
17 A That is true.
18 Q If I could have you look at Exhibit F, please. If you
19 can just read this advertisement. Let me know when you're
20 finished, please.
21 A (Witness indicates with a nod.)
22 Q This appears to be an advertisement for some type of
23 synthetic drug, correct?
24 A I have no idea what it's an advertisement for. It says
25 it's an all natural product, so I don't know if it's a

1 synthetic.
2 Q Well, it appears to be an advertisement for a drug that
3 has similar effects to Ecstasy, correct?
4 A No, I don't know that. It says it's an all natural
5 product that doesn't contain any harmful chemicals.
6 Q Okay. Well, obviously you don't know what's in this
7 product, right?
8 A Yes.
9 Q You don't know what's in this product because the
10 ingredients are not listed?
11 A From the picture that I see it's not. There might be
12 more on the label on the back, I don't know, but from the
13 picture I see, no.
14 Q And from the advertisement there is also no reference
15 to what's actually inside other than it being all natural,
16 correct?
17 A True.
18 MS. MOORE: Objection to form.
19 Q And according to the advertisement they are claiming it
20 has effects similar to the drug Ecstasy, correct?
21 MS. MOORE: Objection to form.
22 MR. SCOLNICK: You can answer.
23 A It appears so, yes.
24 Q And from this advertisement it also claims to be all
25 legal, correct?

1 MS. MOORE: Objection to form.
2 A I don't see it. Let me read here. It doesn't actually
3 say it's all legal, I don't believe it says that anywhere
4 here.
5 Q Well, I'm referring to the sentence in the second
6 paragraph where it says, "Also, Ecstasy contains MDMA that
7 is banned in many countries like the United States. XTZ is
8 BZP, MDMA and PFMPP free and therefore is legal in all
9 countries," correct?
10 A Right. It's not saying that it's not an illegal
11 substance, it could have other substances in it that are in
12 fact illegal, but it is saying that it doesn't have those
13 three substances in it.
14 Q Right.
15 A I believe it's just a play on words consistent with
16 what I've seen in the past.
17 Q And what you see in the past is misleading?
18 A It is a play on words, yes.
19 Q It's misleading because they can say it doesn't have
20 three or four illegal chemicals, right?
21 A It's true.
22 Q And that's the statement that it makes?
23 A Yes.
24 Q And they say therefore it's legal?
25 A They try to make that statement, yes.

1 Q But that's not always true?
2 A True.
3 Q Okay. And it's not always true because there could be
4 other ingredients that are unlawful, correct?
5 A That is true.
6 Q And sometimes the other ingredients will be controlled
7 substances?
8 A True.
9 Q And often times the other ingredients contain analogs
10 to controlled substances, correct?
11 MS. MOORE: Objection to form.
12 A True.
13 Q And analogs to controlled substances are not on the
14 controlled substance list themselves, right?
15 A They are -- no, they are not.
16 Q Okay. So this advertisement would be -- not exactly,
17 but generally consistent with other product's labeling that
18 you've seen before, correct?
19 A Yes.
20 Q Okay. Now, if you were to buy -- if you were looking
21 at this on the internet knowing nothing else, there's no
22 indication from reading this that this is an illegal
23 substance, correct?
24 A Yes.
25 Q And you would have no idea by reading this whether or

1 not you're dealing with a controlled substance, correct?
2 A That is true.
3 Q You would have no idea whether you're dealing within
4 analog to a controlled substance, correct?
5 A True.
6 Q And you would have no idea if the substance was coming
7 from a domestic source, correct?
8 A True.
9 Q Or internationally, correct?
10 A Well, I'm sorry, I misspoke there. I need you to
11 correct that, please. You would know because I believe that
12 you would know the website that you went on and where that
13 would be located if the website -- and this is more towards
14 the user end of it, if I'm seeking out a certain type of
15 product and I'm going on a certain website and I'm buying
16 from a particular place, usually you would know if it's
17 domestic or international.
18 Q Well, does this web page say specifically whether it's
19 located inside the United States?
20 A This says it's page 4 of 13, I don't know where the
21 first three or the rest of the pages are to show, maybe
22 there is an actual place where it says "contact us" where I
23 would be able to see where the address is or the phone
24 number.
25 Q In the absence of that there is no way to really tell

where a company is located, correct?
A Not if you just handed me this piece of paper, no.
Q If I could have you turn to page three of Exhibit F. If you could just read the top third of this, I guess.
A (Witness complies.) I'm finished.
Q Okay. This appears to be an internet page, correct?
MS. MOORE: Objection to form.
A Yes.
Q And I know you haven't seen this, so we're clear, you haven't seen this page before right now, right?
A I have not.
Q From what you are looking at here, it appears they're selling the product Molly X?
A Correct.
Q And they're selling it in -- well, significant quantities, correct?
MS. MOORE: Objection to form.
A It appears to be.
Q A thousand milligrams?
A A thousand milligrams, yes.
Q And it's being sold for $70?
MS. MOORE: Objection to form.
A That's what it says on the page here, yes.
Q Now, looking at this, at this document, it doesn't appear that there are any ingredients that are being

1 disclosed for this product, correct?
2 MS. MOORE: Objection to form.
3 A Not from what I see on here, no.
4 Q From your experience if someone were ordering this,
5 they would be ordering a synthetic drug, right?
6 MS. MOORE: Objection, speculation.
7 Q Based on your experience, do you believe -- what do you
8 believe someone would be interpreting this page as?
9 MS. MOORE: Objection, speculation.
10 Q You can answer.
11 A Okay. In my experience, someone that was seeking out a
12 page like this would be looking to order some type of a
13 synthetic cathinone.
14 Q And that's because the name Molly could be used to
15 refer to synthetic cathinones, correct?
16 A Could be. Or the verbiage in it, the cleaner, it says
17 here toilet deodorizer or cleaner.
18 Q This is an example that's consistent with your
19 experience as to how synthetic cathinones may be marketed,
20 correct?
21 MS. MOORE: Objection to form.
22 A Yes.
23 Q And they can be advertised as toilet deodorizer,
24 correct?
25 MS. MOORE: Objection to form.

1 A Yes.
2 Q They can be advertised as garbage disposal cleaner?
3 MS. MOORE: Objection to form.
4 A Among other things, yes.
5 Q And based on this page, there's no -- again, there are
6 no ingredients that are being disclosed, correct?
7 MS. MOORE: Objection to form.
8 A That is true, there is nothing disclosed.
9 Q And there is no warning that this is a controlled
10 substance, correct?
11 MS. MOORE: Objection to form.
12 A That's true, there is nothing on here.
13 Q There is no warning that this is containing any
14 unlawful substance?
15 MS. MOORE: Objection to form.
16 A That is true.
17 Q And there is no indication that this contains an analog
18 to a controlled substance?
19 MS. MOORE: Objection to form.
20 A That is true.
21 Q In fact, on the left side of the page, there is
22 something that says "all legal cleaning blends," correct?
23 A True.
24 Q And this may be consistent with your -- with
25 advertisements you've seen for synthetic cathinones as well,

1 correct?
2 MS. MOORE: Objection to the form.
3 A Yes, it is.
4 Q And is it fair to say this is a misleading marketing
5 technique?
6 A No, it's not.
7 Q Well, is this really -- do you believe from your
8 experience this is really garbage disposal cleaner?
9 A No, it is not.
10 Q Do you know whether or not this is Methylone?
11 A I don't know.
12 Q Do you know whether this -- from looking at this page,
13 to be fair, from looking at this page, do you know whether
14 this substance is being marketed from the United States or
15 abroad?
16 MS. MOORE: Objection to form.
17 A No, I do not, not on this page.
18 Q If I could have you turn two pages past this, I'm
19 showing you a page entitled, "Smoke Shop Supply Company"?
20 A Yes.
21 Q Okay. This also appears to be another internet
22 advertisement?
23 MS. MOORE: Objection to form.
24 MR. SCOLNICK: Do you have this?
25 MS. MOORE: I do, thank you.

A Yes, it does.
Q It's also purporting to sell Molly's Love Ultra, correct?
MS. MOORE: Objection to form.
A That's what it says, yes.
Q From looking at this page you don't know what this substance -- what the ingredients to the substance is, correct?
A No, I don't. Not on this page.
MS. MOORE: Objection to form.
Q There is no indication that this is -- this substance contains a controlled substance?
MS. MOORE: Objection to form.
A No, there is nothing on here.
Q And there is no indication that this substance contains an analog to a controlled substance, correct?
MS. MOORE: Objection to form.
A That is correct.
Q And there's no indication that this contains any unlawful ingredients at all, correct?
MS. MOORE: Objection to form.
A There's nothing on this page, no.
Q Okay. And I realize I'm throwing a lot of information at you here, but do you see anything from this page regarding the source location of this company?

A No, I do not.
Q So from looking at this page briefly, to be fair, but from looking at this page, you don't know whether this product is coming domestically or internationally, correct?
MS. MOORE: Objection to form.
A That is correct.
Q Okay. Now, we've talked about the term Molly, correct?
A Yes, we have.
Q Molly is a slang term, fair to say?
MS. MOORE: Objection to form.
A Molly is a term usually used to evade law enforcement, yes.
Q Well, Molly is not a name of a -- Molly does not appear in that term on the controlled substance list, right?
A It does not.
Q There is no drug on the controlled substance list called Molly?
MS. MOORE: Objection to form.
A That's true.
Q Molly was -- the term Molly was initially coined to refer to MDMA, correct?
MS. MOORE: Objection to form.
A That's true.
Q And Molly would refer more specifically to pure MDMA, correct?

1 MS. MOORE: Objection to form.
2 A That is true.
3 Q Since then the term has evolved to include more
4 substances, correct?
5 MS. MOORE: Objection to form.
6 A That is true.
7 Q Usually Molly's used to refer to substances that are
8 similar in effects to MDMA, correct?
9 MS. MOORE: Objection to form.
10 A True.
11 Q Usually Molly would be used to refer to synthetic
12 cathinones, correct?
13 A True.
14 MS. MOORE: Objection to form.
15 Q Molly has been used to describe the drug Methylone?
16 A Yes, it has.
17 Q Molly has also been used to describe other drugs, true?
18 A True.
19 Q For example, Molly has been used to describe 4-MEC and
20 alpha-PVP?
21 MS. MOORE: Objection to form.
22 A That's true.
23 Q Do you know whether 4-MEC is a controlled substance on
24 the list?
25 A I don't believe it is, no.

1 Q Do you know --
2 A I'm not sure.
3 Q Do you know whether alpha-PVP is on the list?
4 A I believe they're still analogs, I'm not sure. I would
5 have to refer to the CSA.
6 Q Okay. So it would refresh your recollection if I show
7 you a list of the controlled substance?
8 A Sure.
9 MR. SCOLNICK: I'm sorry. I only have one copy.
10 MS. MOORE: That's okay.
11 A You have one that's in alphabetical order. Okay. Did
12 you ask for alpha-PVP.
13 Q Yes, first, alpha-PVP.
14 A I don't see the acronym alpha-PVP on the controlled
15 substance list, nor do I see the acronym 4-MEC on the
16 controlled substance list.
17 Q Okay. Molly is used -- the term Molly is used to
18 describe some substances that are not yet on the controlled
19 substance list?
20 MS. MOORE: Objection to form.
21 A Yes, that is true.
22 Q Okay. When someone uses the term Molly therefore you
23 cannot determine for certain whether they're referring to a
24 substance that is on the list or not on the list?
25 MS. MOORE: Objection to form.

A That is true.
Q Analogs are often times sold as being a controlled substance, correct?
MS. MOORE: Objection to form.
Q Let me explain that better. That was a bad question.
A Yes.
Q Someone could be buying Ecstasy or -- strike that.
Someone could believe they're buying Ecstasy, and in reality, they're buying something else, correct?
MS. MOORE: Objection to form.
A That is true.
Q For example, someone who is buying Ecstasy could be purchasing Methylone?
MS. MOORE: Objection to form.
A It could be.
Q Someone who is buying Ecstasy could be buying an analog, correct?
MS. MOORE: Objection to form.
A True. Are you being -- I'd like to be more specific. Are you talking on the retail end or the wholesale end?
Q Well, on the retail end, let's start there.
A On the retail end that is a true statement.
Q Okay. And on the wholesale end, your experience with wholesale, as you said before, was one investigation, correct?

A Yes.
Q And just one supplier?
A Yes, that has been my personal experience, but I've utilized resources throughout the United States with other law enforcement agencies to show that on the wholesale end it's been -- more than not it has been actually true what the chemical is that you've been purchasing has been the chemical that you've purchased -- or that you've ordered, I'm sorry.
Q Now, let's go back to your personal experience with this company that you were talking about that's -- it sounds like it's been an on-going investigation over the last two years fair to say?
A Yes.
Q Now, with this company you said they offered Methylone for sale?
A Yes.
Q But you never ordered Methylone?
A No, we did not.
Q You don't know in fact whether the Methylone they were selling would have actually turned out to be Methylone?
MS. MOORE: Objection to form.
A Right, I do not know.
Q You don't know whether the Methylone they were selling could have been an analog?

1 MS. MOORE: Objection to form.
2 A That's true, I don't. But, and I just want to make
3 sure I'm clear, they would have had to have known or been
4 pretty sure what I was looking for, for what they were
5 trying to sell me. In other words, I would not be calling a
6 source in China and asking them for Molly's Love Ultra, I
7 would be calling them asking for Methylone or I would be
8 E-mailing them asking for a particular product. I wouldn't
9 be asking for Molly's Love Ultra brand name already packaged
10 up in a nice little neat package.
11 Q Well, you're talking about the people you were dealing
12 with, correct?
13 A Yes.
14 Q It was sold in a powder form?
15 A Yes, it was.
16 Q And again, do you know from looking at the exhibit you
17 were talking about earlier, which is an advertisement for
18 Molly Love, how it would be sent if you purchased it?
19 A In this particular style of packaging?
20 Q Well --
21 A Is that what you're asking?
22 Q You haven't ordered Molly Love, have you?
23 A No, I haven't.
24 Q So you don't know from your experience how it would be
25 shipped, correct?

1 A No. I do not. I only know what it says, 100 capsules.
2 Q We talked about analogs and about controlled
3 substances, synthetic cathinones. With reference to that,
4 initially, three compounds were most commonly found in the
5 United States, including MDPV, Methadrone and Methylone,
6 correct?
7 A Yes.
8 Q All right. These drugs still remain in the illicit
9 marketplace, correct?
10 A Not so much Methadrone and MDPV, but Methylone, yes.
11 Q Recent intelligence and direct evidence suggests a
12 shift to new drugs within this class that are either
13 currently non-controlled or maybe considered analogs,
14 correct?
15 MS. MOORE: Objection to form.
16 A That is true.
17 Q Recent trends have shifted towards substances like
18 4-MEC?
19 MS. MOORE: Objection to form.
20 Q Correct?
21 A True.
22 Q Recent trends have treated to 4-EMC, drugs like that?
23 MS. MOORE: Objection to form.
24 A I'm not aware of the names.
25 Q But the recent trend is to shift from substances that

1 are on the controlled list to analogs, correct?
2 MS. MOORE: Objection to form.
3 A That is true.
4 Q Because, in part, these analogs are not yet controlled
5 substances, right?
6 A That's true.
7 Q And they may be sold as legal or an alternative to an
8 illegal drug, correct?
9 MS. MOORE: Objection to form.
10 A They could be marketed as such, but not sold as such.
11 Q Okay. But the bottom line is you really never know
12 what you're getting unless you test these drugs in a
13 laboratory, right?
14 MS. MOORE: Objection to form.
15 A That is true. But I will clarify though, it's going
16 back to your Smoke Shop Supply Company right here, they have
17 listed on here Neutronium, Bizarro, Sonic Zero, which I have
18 personally been involved with, STS-135 I've been involved
19 with. Only someone who is involved in the world of
20 synthetic cannabinoids and cathinones, which these are;
21 Bizarro is a cannabinoid, Neutronium and so is Sonic Zero,
22 they're all cannabinoids, would know exactly what they're
23 looking for and trying to obtain on this website. So it
24 could be marketed for the general public as being deodorizer
25 or toilet deodorizer, but I know and everybody else that's

1 in the drug world know that if you order Neutronium incense
2 or Bizarro potpourri, you're going to get something that is
3 similar to a synthetic cannabinoid. So the marketing of it
4 is there, but you were asking earlier, would anybody know?
5 Yes, they would know, because if I'm on that website, there
6 is no reason for me as a general person to be seeking out
7 toilet deodorizer on smokeshopsupply.com. If I was a
8 regular person in society I would be buying my toilet
9 deodorizer at a store, Wal-Mart or somewhere along a regular
10 retailer, not a smoke shop supply company.
11 Q Okay. You said a mouthful there. You said that with
12 your base of knowledge if you looked at this list of
13 substances, you would know that the substances get you high,
14 right?
15 A That they could potentially get you high, yes.
16 Q And you know that they are -- you would know that they
17 are similar, in effect, to other drugs, correct?
18 MS. MOORE: Objection to form.
19 A Yes.
20 Q And you wouldn't know from reading that list whether
21 they were controlled substances, correct?
22 MS. MOORE: Objection to form.
23 A That, I would not.
24 Q And none of those substances that you read off before
25 are in those names that you read on the controlled substance

1 list, correct?
2 A Not in that name, no.
3 Q And none of the substances that you read before list
4 ingredients, correct?
5 MS. MOORE: Objection to form.
6 A No, they do not.
7 Q So you read off a list of names there, and we can do
8 down them one-by-one, but let's speak generally, starting
9 with -- well, let's just refer to all of them, you don't
10 know what is in any given substance that's being listed
11 there, the specific chemicals, right?
12 MS. MOORE: Objection to form.
13 A I could tell you at the time that I purchased or the
14 time that we seized them from the retail establishment, if I
15 referred to my lab report, I could tell you exactly what was
16 in them.
17 Q Okay. But it's not uncommon for different batches of
18 the same brand to contain different drugs?
19 A That is true.
20 Q So, again, you don't know, looking at that list, the
21 specific chemical makeup of any of those substances?
22 MS. MOORE: Objection to form.
23 A I do not, but what I do know is anyone looking at this
24 website is looking at this website for that particular
25 brand, because history has shown that Bizarro has contained

1 a certain type of chemical that will, in fact, get you high
2 when you smoke it.
3 Q But again, if I could just have a very simple answer to
4 a simple question: You don't know the chemical makeup of
5 any of those substances as you sit here today?
6 MS. MOORE: Objection, asked and answered.
7 Objection to form.
8 Q You can answer.
9 A I do not know. This one right here right now, no, I do
10 not.
11 Q You don't know the specific chemical makeup of any of
12 the substances on that page, correct?
13 A As of today right now, no, I do not.
14 Q Okay. Thank you. If I could refer you to -- I'm a
15 little confused. I want to clarify something. You
16 personally have never been involved in a Methylone case?
17 A That's not true, I currently am right now.
18 Q Well, tell me about that.
19 A I'm not willing to disclose the --
20 Q I'm not asking for any classified information. But can
21 you tell me whether that's an international case or domestic
22 case?
23 A There is a potential for it to be linked to
24 international, yes.
25 Q But you don't have that link yet, right?

A Not firmly where I would be willing to say that I have it, yes.
Q And if we're talking about something classified, then tell me, but I want to make sure that in this case that involved Methylone, you or one of your fellow agents wasn't ordering it online, correct?
A No.
Q You weren't ordering it online?
A No, we were not.
Q You personally have not been involved in an internet Methylone case, correct?
A Personally, no.
Q You personally have not been involved in a case where Methylone was ordered from China, correct?
MS. MOORE: Objection to form.
Q Correct?
A Not directly, no.
Q Has your team of agents -- I assume you work with a team of agents, correct?
A Yes, I do.
Q How many agents are on the team?
A Ten.
Q Have any of the ten team of agents that you work with directly been involved in a Methylone internet case?
A No.

Q Have any of the ten agents you work with ever successfully ordered Methylone internationally from the internet?
A Well, if we've never ordered it, we couldn't be successful or not, we haven't, right?
Q I just want to make clear we're on the same page.
A Okay.
Q To your knowledge, have any of the agents on your team ever successfully ordered -- I'm sorry, strike that.
Have any of the agents on your team attempted to order Methylone on the internet?
A No, we have not.
Q Okay.
A But there are other agents that I've consulted with within the DEA that have, in fact, ordered Methylone.
Q Okay. So you've spoken with them about their experience ordering Methylone, right?
A Yes.
Q Have they ever provided you with a web page they ordered from?
A No.
Q Did you see a copy of the web page?
A No.
Q Did you ever see the order form?
A No it's all there if I ever needed it. I knew it was a

1 resource. I asked, they said it was there. If you ever
2 need it, it's here for you when you want it.
3 Q And when did you have these conversations?
4 A Throughout various times, you know, the investigation
5 has been on-going since 2011.
6 Q Okay. And again, as you sit here today, you haven't --
7 I'm sorry. Strike that.
8 So you have spoke with people who have
9 successfully ordered Methylone on the internet?
10 A Yes.
11 Q And what did you speak to them about it, what did they
12 tell you about that experience?
13 A That they have established a source supply in different
14 parts of the country, and that through the packaging that
15 they have received, it had a Chinese address on it, and
16 therefore, they have a Chinese source supply.
17 Q And did they tell you about the ordering process
18 itself?
19 A Other than going on the internet, logging onto a web
20 page and placing an order, that's pretty much it.
21 Q Do you know what the amount of the substance was?
22 A I do not.
23 Q All right. Do you know the purity of the substance
24 that they ordered?
25 A I do not.

1 Q Do you know the timeline of when they ordered this?
2 A No. Like I've told you before, and I didn't get into
3 specifics, I was just asking and saying that there was a
4 resource available. And they said yes, if I want more
5 specifics, I can get it from them.
6 Q Do you know at the time they ordered Methylone whether
7 it was on the list of controlled substances?
8 A I would imagine so, because it's been since 2011, and
9 2011 is when it went on the controlled substance list.
10 Q So you've spoke with these agents since 2011?
11 A Yes, I have.
12 Q And did the agents specifically tell you that this
13 experience with these cases or these orders were placed
14 after it was a banned substance?
15 MS. MOORE: Objection to form.
16 A I believe it was just assumed, because it was 2011 and
17 it is until now that Methylone is on the controlled
18 substance list.
19 Q So they did not specifically tell you that these orders
20 were made when Methylone was a controlled substance?
21 MS. MOORE: Objection to form, asked and answered.
22 Q You can answer.
23 A I believe that's a question that doesn't have to be
24 asked, we all know that as professionals.
25 Q First of all, you didn't ask the question, right?

1 MS. MOORE: Objection.
2 A No, I did not, I don't feel that I needed to.
3 Q All right. When you're talking about the trends of
4 these controlled substances, you mentioned earlier that
5 you're able personally to buy analogs to other controlled
6 substances on the internet, correct?
7 A Yes.
8 Q And these analogs were called by their proper name?
9 A Yes, they were.
10 Q And before Methylone was added to the controlled
11 substance list, it was also considered an analog, correct?
12 A Yes.
13 Q And the DEA had its eye on Methylone since before it
14 was added to the controlled substance list, correct?
15 MS. MOORE: Objection to form.
16 A Yes.
17 Q In fact, we looked at a statement from the director of
18 the DEA from April of 2011, right?
19 A Yes.
20 Q And that was before Methylone was on the controlled
21 substance list?
22 A I assume so, yes.
23 Q And we talked about statistics that was gathered prior
24 to April of 2011, right?
25 A Yes.

1 Q From the DEA, right?
2 A Yes.
3 Q Okay. And this intelligence would be based on
4 officer's experience, among other things, right?
5 MS. MOORE: Objection to form.
6 A I assume so, yes.
7 Q And you don't know if these other agent's orders of
8 Methylone occurred during that phase when Methylone was
9 considered an analog or when it was -- or whether they
10 occurred after it was placed on the controlled substance
11 list?
12 MS. MOORE: Objection to form.
13 A Yes, I guess.
14 Q You don't know, correct?
15 A No, I don't.
16 Q Okay. Thank you. If we could -- let me see if I can
17 have a minute, please.
18 (Pause.)
19 Q Again, I'd like to refer you back to Exhibit D, and
20 this is -- to refresh your recollection, this is a
21 congressional statement of Mr. Rannazzisi?
22 A Okay.
23 Q Okay. If you look at page five, in the second full
24 paragraph one, two, three, four, five, the fifth line down
25 there is a sentence starting with "no" on the right side.

1 A Yes.
2 Q If you could read that, please?
3 A "No longer are these substances sold in a covert manner
4 to avoid detection by law enforcement authorities."
5 Q And the next sentence?
6 A "Instead, the substances are sold openly on the shelves
7 at gas stations, convenience stores, head shops and via the
8 internet from both domestic and international sources."
9 Q This is a statement concerning synthetic drugs,
10 correct?
11 MS. MOORE: Objection to form.
12 A I -- yes.
13 MS. PARLOVECCHIO: Counsel, I'm going to ask for
14 an opportunity to review the whole page instead of reading
15 statements in isolation in which he has no understanding of
16 what the context is.
17 Q Okay. If you could read the first pull paragraph --
18 I'm sorry, the second paragraph.
19 A (Witness complies.) Okay.
20 Q Do you understand the context of this paragraph?
21 A I do, yes.
22 Q You read two sentences earlier, and these were talking
23 about the way that these items are sold, correct?
24 MS. MOORE: Objection to form.
25 A Yes.

1 Q And the statement indicated that these substances are
2 sold openly in stores, correct?
3 MS. MOORE: Objection to form.
4 A Yes.
5 Q And they're also sold on the internet domestically and
6 internationally, correct?
7 MS. MOORE: Objection to form.
8 A Yes, that's what it says.
9 Q This statement appears to be current, correct?
10 A Yes.
11 Q And this statement is consistent with your
12 understanding as well?
13 MS. MOORE: Objection to form.
14 Q Correct?
15 A Not necessarily.
16 Q Okay. The substances are sold on the internet,
17 correct?
18 A Yes.
19 Q They're sold domestically and internationally, correct?
20 A Yes, that is true.
21 Q Okay. Going to the first full paragraph we referred to
22 -- well, why don't you read the first full paragraph,
23 please?
24 A (Witness complies.) Okay.
25 Q Okay. You've read the statement. Do you understand

1 the context of the statement?
2 A Yes, I do.
3 Q The sentence that says, I quote, "The manufacturers and
4 retailers who make and sell these products do not disclose
5 all the product's ingredients, including the active and
6 potentially harmful ingredients." That's a true statement,
7 correct?
8 MS. MOORE: Objection to form.
9 A It's true.
10 Q Okay. And often times the marketing of these products
11 is intended to get around the Controlled Substances Act,
12 right?
13 MS. MOORE: Objection to form.
14 A True.
15 Q In fact, the production of these substances is also
16 designed to get around the Controlled Substances Act, right?
17 MS. MOORE: Objection to form.
18 A I'm not sure what your question is.
19 Q What I mean is when the substance is banned, scientists
20 will then try to chemically modify the drug into a new
21 substance, correct?
22 MS. MOORE: Objection to form.
23 A Historically, yes.
24 Q And they do this so they have got a new substance with
25 presumably a different name, correct?

A Yes.
Q And they're able to market this new substance as not a controlled substance, right?
MS. MOORE: Objection to form.
A True.
Q And this allows these manufacturers to get around the Controlled Substances Act, right?
MS. MOORE: Objection to form.
A To an extent, yes.
Q Okay.
A They're still analogs.
Q That's fair. They are able to -- by changing the name of a chemical and the chemical structure, they are able to offer a substance that is not on the controlled substance list?
MS. MOORE: Objection to form.
A True.
Q And then they can advertise that this substance is not on the controlled substance list?
MS. MOORE: Objection to form.
A True.
Q And that statement could potentially be misleading, right?
MS. MOORE: Objection to form.
A Potentially.

1 Q Because it could be referring to an analog or a similar
2 substance to a controlled substance, right?
3 A True.
4 MS. MOORE: Objection to form.
5 Q And manufacturers and retailers don't always disclose
6 that they're selling or manufacturing an analog, correct?
7 MS. MOORE: Objection to form.
8 A That is true. Not always, no.
9 Q A quick search on the internet will show that there are
10 a number of sites that sell synthetic drugs, right?
11 MS. MOORE: Objection to form.
12 A True.
13 Q And these sites in many cases refer to themselves as
14 providing, "legal highs" and refer to the fact that they are
15 in compliance with government synthetic bans, right?
16 MS. MOORE: Objection to form.
17 A I'm not sure what sites you're talking about. I'm
18 assuming some of them do, I don't know.
19 Q Okay. Well, this statement, and I'll read it again,
20 "these sites in many cases refer to themselves as providing
21 legal highs and refer to the fact that they are in
22 compliance with government synthetic bans." Is that a true
23 statement?
24 A I don't know. Does every site do it? I don't know.
25 Q Okay. Let's start with this: Some sites refer to

1 themselves as providing leg highs?
2 MS. MOORE: Objection to form.
3 A Some, yes.
4 Q And some sites refer to the fact that they are in
5 compliance with synthetic bans, correct?
6 A Some do, yes.
7 Q Okay. And, let's see, are you familiar with the DEA's
8 efforts to curb the abuse of synthetic designer drugs?
9 A Yes.
10 Q And isn't it true that the DEA is trying to notify the
11 retailers regarding the illegal natural of these synthetic
12 drugs?
13 MS. MOORE: Objection to form.
14 A I don't believe DEA itself on a federal level has. I
15 believe it's a state -- the state was notifying.
16 Q Okay. If I could have you look at Exhibit B, page
17 four, please?
18 MS. MOORE: Which page?
19 MR. SCOLNICK: Four.
20 MS. MOORE: Thanks.
21 Q And the bottom paragraph, if I could have you read
22 that, please?
23 A "United States attorneys and their DEA counterparts
24 have been creative in identifying and implementing
25 preventive strategies in this area. In June of 2013, DEA

1 sent a letter to each of the top 100 retailer convenience
2 store and gas station chain corporations --
3 Q Why don't you read it to yourself, it might be easier
4 for all of us. It's my fault.
5 A (Witness complies.) Okay. I'm done.
6 Q Isn't it true that the DEA has notified a number of
7 retailers regarding synthetic drugs?
8 MS. MOORE: Objection to form.
9 A Yes, they are.
10 Q And isn't it also true that the DEA has attempted to
11 work with these retailers to ensure that they do not sell
12 synthetic drugs?
13 MS. MOORE: Objection to form.
14 A True.
15 Q And they worked with the retailers to notify them that
16 these synthetic drugs are illegal, correct?
17 MS. MOORE: Objection to form.
18 A True.
19 MR. SCOLNICK: I think that's it. We're right on
20 time to go upstairs. Thank you.
21 THE WITNESS: Thank you.
22 (End of deposition at 11:29 a.m.)
23 *****
24
25

1
2 **CERTIFICATION**
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4
5 I certify that the foregoing is a correct transcript from the
6 record of proceedings in the above-entitled matter.
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9 Official Court Reporter January 2, 2014
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2 UNITED STATES DISTRICT COURT
3 EASTERN DISTRICT OF NEW YORK
4 ----------
5 UNITED STATES OF AMERICA,
6 PLAINTIFF,
7
8 vs. No. 13-CR-570(JBW)
9
10 CHIN CHONG,
11 DEFENDANT.
12 ----------
13 August 22, 2014
14 10:25 a.m.
15
16
17 TELEPHONIC DEPOSITION of
18 DR. JOHN HALPERN, M.D., held at United States
19 District Court - Eastern District of New York,
20 225 Cadman Plaza East, Brooklyn, New York,
21 Pursuant to Notice, before CHARISSE KITT, CRI,
22 CSR, RMR, FCRR, a Notary Public of the State
23 of New York.
24
25

2

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

4

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2 MR. SCOLNICK: Good morning,
3 again, Dr. Halpern. This is Chase
4 Scolnick, we're on the record here
5 today.
6 THE WITNESS: Okay.
7 MR. SCOLNICK: Can we start by
8 placing you under oath?
9 THE WITNESS: Yes.
10 DR. JOHN HALPERN, M.D.,
11 called as a witness, having been duly sworn,
12 was examined and
13 testified as follows:
14 THE WITNESS: John Halpern,
15 H-a-l-p-e-r-n.
16 EXAMINATION BY MR. SCOLNICK:
17 Q Dr. Halpern, we have a lot of
18 ground to cover today and I realize you're a
19 busy man, so I want to get started by talking
20 briefly about your qualifications.
21 A Sure.
22 Q Okay. I'm going to just lead you
23 through that in a few questions, so we can
24 kind of just get the substantive matters.
25 Is it true that you're a medical

2 doctor?
3 A Yes.
4 Q And you're licensed?
5 A Yes.
6 Q Did you go to or attend a
7 residency program?
8 A Yes.
9 Q What was that in?
10 A In psychiatry.
11 Q And where was that?
12 A At the Harvard Longwood Psychiatry
13 Residency training program.
14 Q And after completing your
15 residency, were you awarded research
16 fellowships at Harvard?
17 A Yes.
18 Q Go ahead.
19 A I had a Peter Livingston Award and
20 was the fellow from Harvard Medical School for
21 my research, as then I received government
22 funding for my research and my training.
23 Q And since that training have you
24 worked as a director or a psychiatrist in
25 charge of coverage for hospitals in the Boston

2 area?
3 A I am director of coverage for the
4 Division of Alcohol and Drug Abuse at McLean
5 Hospital which comprises all elements of the
6 clinical services we provide for substance
7 abuse and those suffering with mental health
8 issues as well. I also am the director of the
9 laboratory for integrative psychiatry at my
10 institution as well.
11 Q Are you also a professor at
12 Harvard Medical School or associate professor?
13 A Yes. I have a professorship
14 appointment at Harvard Medical School and
15 that's specific to my research of the affects
16 of hallucinations.
17 Q And in your experience with
18 working in hospitals as an alcohol and abuse
19 researcher and counselor, have you encountered
20 people who have been addicted or abusing drugs
21 before?
22 A All the time and pretty much on a
23 daily basis in my work.
24 Q Is it fair to say you've been in
25 contact and interviewed and treated thousands

2 of people who are suffering from drug related
3 issues?
4 A It would be hard to put the exact
5 order of magnitude, but since completion of
6 residency in 1998, I'm sure it's well towards
7 a few thousand people.
8 Q Are you also aware of national
9 statistics and research involving substance
10 abuse issues?
11 A I am.
12 Q And I understand you've been
13 published a number of times in the field of
14 substance abuse and psychologic substances.
15 Is that right?
16 A That's correct.
17 Q And looking at your resume, it
18 looks like probably around 60 different
19 publications, between peer review articles,
20 invited articles and book chapters, abstracts,
21 and letters to the editor. Is that roughly
22 accurate?
23 A That sounds approximately correct.
24 MR. SCOLNICK: Okay. I am going
25 to offer your resume, your CV, excuse

2 me, as Defense Exhibit B to the hearing
3 today, previously provided to the
4 government.
5 (Defendant's Exhibit B1 so
6 marked.)
7 Q Now, Dr. Halpern, I'd like to move
8 on to the substance of your testimony today,
9 and I want to just take a broad picture of
10 what we're talking about before we get into
11 specifics.
12 You're familiar with MDMA, the
13 drug MDMA. Is that correct?
14 A Yes.
15 Q And you've testified about this
16 before?
17 A Yes, I have.
18 Q Are you familiar with the
19 Sentencing Commission's analysis of the drug
20 MDMA conducted in 2001?
21 A Yes, I am.
22 Q And are you familiar with the
23 current state of research regarding MDMA?
24 A There's a tremendous amount of
25 research that is ongoing and published, but I

2 think I'm pretty well versed in the
3 literature, yes.
4 Q Now, you testified before, I
5 understand, that MDMA is a harmful drug. Is
6 that still your opinion today?
7 A Absolutely.
8 Q Okay. Relative to other drugs,
9 specifically cocaine, do you believe that MDMA
10 is more or less harmful than cocaine?
11 A It is my clinical and expert
12 opinion that MDMA obviously is less dangerous
13 than cocaine. No physician could determine
14 otherwise.
15 Q We'll get into that in some more
16 detail. Regarding the state of research and
17 understanding of MDMA, between 2001 and today,
18 how has the understanding and research
19 regarding MDMA's affects on the body changed?
20 A Well, broadly speaking, since 2001
21 there's been a better research system to track
22 humans over time and to have a better
23 understanding of the human/animal dosing rate
24 to, you know, try to compare animal work to
25 human work, primarily by myself, in making a

2 better attempt to control the heat compounds
3 and construct our confidence in earlier
4 studies, and there's definitely better
5 technology since 2001. And that is the result
6 of understanding how MDMA impacts, for
7 example, the serotonin transporter in the
8 brain.
9 Q What was the understanding in
10 2001, for example, involving serts?
11 A Well, it was believed that MDMA
12 would be neurotoxic, would cause a decrease
13 in -- the physical transfer binding would be
14 decreased after ecstasy and it would stay that
15 way. There's evidence that there's some sort
16 of urine toxic event occurring from the
17 substance. And since then we've known from
18 research that with time that sert binding
19 actually return to levels that are comparative
20 to non-users.
21 Q So if I understand you correctly,
22 this data, the scientific community or
23 understanding in 2001 was that there were
24 permanent changes regarding the sert or
25 serotonin levels in the brain after use. Is

2 that correct?
3 A Yes. Particularly it's an
4 important study by Dr. Kish, published in
5 2010, in which using newer or more advanced
6 technology did not find serts in the
7 transporters. And so there's no global
8 massive production of brain serotonin
9 transporter binding. And there's been no
10 substantive study to invalidate Dr. Kish's
11 work.
12 Q You mentioned that Dr. Kish's work
13 found that there was no global mass production
14 in serotonin levels or activity in the brain.
15 What was the understanding regarding that in
16 2001? Was the belief in the scientific
17 community that there was such a global
18 reduction or --
19 A Yeah. There's -- my colleague
20 McCann published in 1998, I believe, claiming
21 that there was loss of serotonin transporters
22 throughout the brain. And so that's -- that's
23 been replaced, I think, with a much approved
24 methodology and a more accurate -- a more
25 accurate sert that was used by Dr. Kish that

2 wasn't available to Dr. McCann.
3 And so the 1998 data that I
4 believe the Sentencing Commission relied on is
5 no longer considered the current scientific
6 conclusion drawn from the literature at this
7 point.
8 Q You mentioned what the -- what the
9 Sentencing Commission considered in 2001. Are
10 you familiar with a document called the -- I
11 believe the SSC or MDMA Report that the
12 Sentencing Commission considered in 2001?
13 A Yes, I am.
14 Q And is it your understanding,
15 based on these new findings and research
16 techniques that you described, that the
17 concerns and fears and research cited in the
18 2001 report has changed significantly?
19 A That's correct.
20 Q And based on those changes, it is
21 your conclusion that the fears and concerns in
22 the 2001 report have not been realized?
23 A That's correct. Not only has it
24 not been realized in basic clinical research,
25 but even looking at public health measures.

2 By now you would be seeing a much different
3 picture from the public health standpoint were
4 those fears to be realized upon those people
5 having significantly abused MDMA.
6 Q And what type of public health
7 measures are you referring to?
8 A Well, back then there were fears
9 that MDMA use would lead to a whole generation
10 that would be depressed or would not respond
11 to antidepressants or would -- there would be
12 a wave of Parkinson's disease, and none of
13 those things have been realized. There was
14 concern about addictive potential, and present
15 we are -- it is obvious that MDMA is not
16 reinforcing, causing crime addiction when, for
17 example, cocaine is. And that, of course, is
18 reflective quite obviously in other measures,
19 such as the government's data on emergency
20 room visits that, you know, close to 200,000
21 people a year showing up with cocaine as a
22 permanent feature in the United States. We
23 have less than, you know, anywhere from 8 to
24 12,000 a year for MDMA.
25 So it's just a dangerous thing for

2 America to present to our communities that
3 cocaine is safer than MDMA.
4 Q Right. I think you mentioned some
5 public health measures and some data from
6 emergency rooms. I think it would be best if
7 we can maybe look at the social metrics
8 involving the two drugs or involving MDMA
9 relative to other controlled substances, and
10 then perhaps we can get more into the
11 scientific research regarding brain activity,
12 memory loss, those types of subjects.
13 So let's start with the relative
14 societal harm caused by MDMA.
15 Are you aware of any studies that
16 have compared the relative societal harms of a
17 number of controlled substances?
18 A Yes. There's been a number of
19 publications on this; most prominently was the
20 work of Dr. David Nut, in England, who
21 published about relative risk across drugs
22 using a methodology assessment of harms. But
23 there's other studies that rank harm of drugs
24 such as, I believe a paper by Dr. Amsterdam, a
25 colleague, that was published in 2010.

2 Another one by Dr. Morgan that was published
3 also that year.
4 And I believe there was a recent
5 study also published that surveyed physicians,
6 asking their opinions, looking at a set of
7 criteria of harmful drugs also.
8 Q Thank you.
9 Now, Doctor, you mentioned a
10 number of studies that were conducted
11 regarding the relative harms of controlled
12 substances. Was there any consensus within
13 those studies regarding their treatment or
14 consideration of the dangers of MDMA?
15 A Yeah. They all ranked MDMA as
16 much less dangerous than cocaine. There's
17 no -- there's nothing offered in the data
18 suggesting otherwise.
19 Q So that would be in each one of
20 the studies you talked about?
21 A Yes.
22 Q All of the studies concluded that
23 MDMA was, would it be fair to say,
24 significantly less harmful than cocaine?
25 A Yes. Exactly what is reflected

2 whenever I speak with colleagues. I surveyed
3 every physician in my division of alcohol and
4 drug abuse, asking them just, you know, which
5 is more dangerous, cocaine or MDMAs. To the
6 last physician, exactly the same as what's in
7 those papers, said MDMA is considered safer
8 than cocaine, and it's obvious why.
9 We deal with cocaine, the damages
10 from cocaine abuse on a daily basis. The
11 number of times that we admit people for MDMA
12 abuse is a prominent feature in their
13 admission. This is an extremely rare event.
14 I can't recall even the last time that I have
15 admitted somebody because of MDMA use.
16 Q And in those studies, how did MDMA
17 rank compared to, say, alcohol or nicotine, if
18 you can recall?
19 A It ranked lower than all of those
20 studies. Lower than cocaine and lower than
21 tobacco.
22 Q And do you recall any statistics
23 regarding comparative harms between MDMA and
24 marijuana in those studies?
25 A It was ranked near marijuana. It

2 was ranked slightly higher than marijuana, I
3 believe, by Dr. Morgan and as well as
4 Dr. Amsterdam's paper, and I believe also in
5 Dr. Nut's. But I need to look at Dr. Nut's
6 study again to confirm them.
7 Q That's fine. I'm concerned about
8 the timing here, the date of these studies.
9 Have any of these studies, to your knowledge,
10 been published since 2011, or since early
11 2011?
12 A Yeah, there are studies from other
13 physicians. A few hundred physicians have
14 published since 2011.
15 Q So is it your understanding that
16 this data was not available at the time of the
17 hearing in United States versus McCarthy, in
18 Southern New York?
19 A Yes, that's correct. That's
20 subsequent to the McCarthy Hearing.
21 Q You talked about your own
22 experience, having dealt with thousands of
23 people involved in drug abuse and treated them
24 and also speaking with other doctors in your
25 field. And is it your opinion that there is a

2 consensus regarding the comparative harms of
3 MDMA regarding cocaine?
4 A Yes.
5 Q And what is that consensus?
6 A The consensus is that cocaine is
7 more dangerous than MDMA.
8 Q Okay. I'd like to go on to some
9 example as to why. First, is it your
10 understanding or accepted understanding of the
11 scientific community that cocaine is
12 addictive?
13 A That is correct.
14 Q Is it your understanding, given
15 the current state of research, that MDMA is
16 addictive?
17 A No. It's not showing the
18 reinforcing properties that are exhibited by
19 cocaine. The vast majority of people who
20 abuse MDMA do so in a time limited fashion and
21 do not continue to ingest this in a repetitive
22 pathological way that occurs in cocaine
23 dependents.
24 Q I believe Dr. Parrot testified
25 that MDMA is, quote, one of the least

2 addictive drugs, end quote. Would you agree
3 with that conclusion?
4 A I absolutely enjoy whenever I can
5 agree with Dr. Parrot saying something
6 accurately, and that is one of them. Yes, I
7 agree with that statement.
8 Q Well, we'll get into Dr. Parrot's
9 research in a few minutes, but getting back to
10 cocaine and MDMA. You mentioned that cocaine
11 is addictive, whereas MDMA is not. Given your
12 experience and research in the field, what are
13 the societal harms related to an addictive
14 drug?
15 A Well, it's -- obviously it's
16 dependent on also the direct psychological
17 affects of the drug or the intoxication as
18 well as on the other end of it, just the
19 health consequences that might --
20 So, for example, tobacco.
21 Nicotine is highly, highly addictive and it is
22 one of the leading killers in the world. So
23 it's very dangerous. But in terms of it's
24 impact on cognitive function and general sense
25 itself, it's much less dangerous.

2 So it's more complicated than just
3 those factors alone. Each drug has its own
4 risk profile. But, you know, we look at
5 things like, does it promote morbid illness
6 and does it damage people's functioning in a
7 clinical significant way. And if we just --
8 looking at it from that layman's perspective,
9 what's the clinical upshot of, you know, being
10 an abuser of a drug. You look at measures
11 such as employment, their medical and mental
12 health, and whether there's any observed
13 deference in performance because of that
14 abuse. And without a doubt, cocaine, you
15 know, highly impacts people's lives, whereas
16 we don't see that with MDMA.
17 Q Now, I want to get into that a
18 little bit more. You said that cocaine would
19 affect, certainly would affect people's
20 health. Is that your testimony?
21 A Absolutely. It causes heart
22 attack and stroke and overdose and it leads --
23 it's one of the leading drugs of abuse that
24 land people in the emergency rooms.
25 Q And you've dealt with and treated,

2 I'm assuming, a number of people who have been
3 addicted or having trouble with cocaine.
4 Correct?
5 A Absolutely.
6 Q Is it your experience or is it the
7 scientific consensus in the community that
8 cocaine also has a negative effect on
9 people's, we'll say, family relationships?
10 A Absolutely.
11 Q Could you explain that, please.
12 A Well, because this drug wears off
13 really fast and has an acute craving, such
14 that people will want to continue to use, and
15 so they will spend a tremendous amount of
16 money until they become dependent on it. And
17 this pathological behavior will continue over
18 days and longer. And then there's a period of
19 where they, quote/unquote, crash and then they
20 will wind up doing this again. And the amount
21 of days that they wind up using expands. And
22 the amount of drug they use expands.
23 All of the criteria says they are
24 physiologically and psychologically dependent
25 on the drug even though they know it's

2 destructive, even though they know it's
3 hurting themselves.
4 People who use MDMA do not have
5 such a pattern of abuse. They will typically
6 take, you know, one or more pills on a single
7 occasion and not on successive days, because
8 acute tolerance builds. So somebody who takes
9 MDMA, you know, the very next day, it will
10 have a much more attenuated effect and there's
11 no way to surmount that by taking more.
12 In fact, many, many, many people
13 who consume this drug describe that it stops
14 having the primary desired effects after
15 several uses, and that then self limits how
16 much people wind up going into this phase of
17 life of using. Most people wind up moving on
18 in their lives and stop using MDMA.
19 Q Thank you.
20 Have you noticed through your
21 research or have you noted through literature
22 a relationship between cocaine use, addiction,
23 and crime?
24 A Well, again, absolutely. In one
25 of the clinics that I'm -- that I work at, I

2 also have patients that are in the final
3 stages of release from the Federal Bureau of
4 Prisons, so they're in a halfway house shelter
5 transitioning them, you know, to probation.
6 And I have examined a number of people who
7 were incarcerated because of their crimes with
8 distribution for cocaine. And it's just
9 remarkable how this very dangerous lifestyle
10 will affect our communities. It's a real
11 mess.
12 Q And when you say a very dangerous
13 lifestyle, is that a dangerous lifestyle
14 that's typically associated with cocaine use?
15 A The patients I'm thinking of are
16 people who wind up being abusers of cocaine,
17 who also are involved in the distribution of
18 cocaine illegally. And invariably there's a
19 tremendous history of associated violence,
20 guns and gang collusion in these distribution
21 systems.
22 Q And are those patterns also
23 typical of MDMA users?
24 A No, it's not the same. There are,
25 of course, distribution systems of criminal

2 enterprises that are distributing MDMA, but
3 there's also a much different pattern of abuse
4 and abuse by users themselves, so it's not the
5 same. I'm sure there are criminal gangs who
6 make MDMA sales a part of their enterprise,
7 but there's many people who abuse this drug
8 who seem to believe that within their culture
9 that it's important for them to make
10 additional MDMA available to friends and even
11 family, and it's not about profit.
12 Q Okay. From your experience how is
13 MDMA ingested?
14 A MDMA typically is ingested orally.
15 However, there are people who will also
16 nasally, you know, snort it, and also take it
17 as an enema. I've had a couple of patients
18 who were heavy drug users who also injected
19 MDMA, but the vast majority of people ingest
20 it orally.
21 Q Okay. And regarding cocaine, how
22 is cocaine typically ingested?
23 A Cocaine is typically ingested
24 through snorting powder cocaine or through the
25 smoking of it, freebase, or a cheaper crack

2 variant.
3 Q And --
4 A Some people also will inject it,
5 and some people will inject it as a speedball,
6 so they inject it with heroin. And I myself
7 at the government funded research in which I
8 injected government sourced cocaine to show
9 how cocaine causes local tissue, you know,
10 suppression.
11 For example, the transmission of
12 HIV from needles is more likely, of course,
13 with cocaine, not MDMA. Another example of
14 how dangerous cocaine is, apparently.
15 Q So there is a higher risk of HIV
16 associated with cocaine use than for MDMA use?
17 A I would expect so. Because MDMA
18 is not typically intravenously injected,
19 whereas there is a substantial portion of
20 abusers of cocaine who will use needles.
21 Q Is it fair to say that the vast
22 majority of MDMA users use the drug in pill
23 form?
24 A I'm sure that is certain. I would
25 expect almost 100 percent of people, even

2 those who state that they -- they like to
3 snort it. Even those people who also
4 routinely take it orally as an ingested pill
5 or capsule.
6 Q Is it true that with respect to
7 marijuana, marijuana is typically smoked?
8 A In the United States, yes, it's
9 typically smoked. Other consumption is
10 orally, that people will eat it and swallow
11 it; or some people are not quite smoking it
12 but are volatilizing it. It's heated to a
13 temperature that releases the compounds from a
14 liquid state to gastric without burning it.
15 Q With respect to the vast majority
16 of people in this country who are smoking
17 marijuana, are there any health risks
18 associated with smoking marijuana?
19 A Well, there are. The lungs are
20 not designed for taking vegetative matter and
21 burning it or heating it into our lungs. And
22 so there can be changes to the physical
23 functionality of the lungs and there has -- in
24 the past there was concern that the smoking of
25 marijuana is more dangerous than tobacco

2 because of the tars and whatnot in the
3 cannabis. But important research tends to
4 show -- has borne that out through the work of
5 Dr. Tishkent, the leading expert on lung
6 cancer.
7 And so it was his work -- for
8 example, years ago people would say one
9 marijuana cigarette has the tar of a pack or
10 two of tobacco. And it was his work that most
11 recently showed that marijuana did not promote
12 lung cancer. In fact, we know that cannabis
13 has antitumor properties. And so the extreme
14 concerns about marijuana may be more related
15 to those people that combine tobacco with the
16 cannabis; because cannabis abusers tend to
17 hold what they inhale in their lungs for a
18 longer period of time than somebody smoking a
19 cigarette. So if there is nicotine, if there
20 is tobacco present when somebody is doing
21 that, it makes the exposure to tobacco, even
22 if it's a much smaller amount, much more
23 dangerous for the individual.
24 Q What are the risks associated with
25 inhaling marijuana smoke, including the paper

2 usually used to roll the marijuana into
3 marijuana joints or cigarettes? Is that risk
4 present in the ingestion of MDMA?
5 A No, because it's not -- it's not
6 smoked or consumed like marijuana or tobacco.
7 Q And with respect to ingesting
8 cocaine, as it sounds like the majority of
9 people do in this country by snorting it or
10 inhaling it through your nose, are there any
11 health risks associated with ingesting
12 marijuana -- I'm sorry, ingesting cocaine in
13 that fashion?
14 A There's a number of risks because
15 cocaine is strongly constrictive, tightening
16 of arteries, and that can cause tissue death.
17 That's why some people wind up having heart
18 attacks.
19 Q And are those risks present, to
20 your knowledge, with the ingestion of MDMA?
21 A No, I'm not aware of those risks
22 being present. There is evidence that if MDMA
23 somehow was being ingested chronically every
24 single day, that it will cause alterations to
25 heart valves. And we also believe from that

2 data that it is reversible when the exposure
3 stops. It takes time for the reverse of that
4 damage, but it should occur. But this is not
5 a pattern of ingestion that occurs in humans.
6 Q So if I understand that last part
7 correctly, any damage to the heart associated
8 with MDMA would both be temporary and based on
9 a use pattern that would not be likely to be
10 seen in humans?
11 A That is an accurate summary of
12 what I just said.
13 Q Okay. Now I want to talk about
14 the behavior typically associated with these
15 various drugs. Are you aware of any link or
16 relationship between cocaine use/abuse and
17 violent behavior?
18 A Yes. Cocaine is a powerful
19 psychoactive stimulant. It can induce
20 megalomelia behavior, narcissistic overdrive
21 of egos -- a person believes that they are
22 more powerful than they are -- and it promotes
23 aggression. So, yes, cocaine abuse is
24 associated with a higher risk.
25 Q Can the same be said for MDMA?

2 A No. The psychological effects of
3 MDMA are not consistent with any of those that
4 I described about cocaine.
5 Q Now, is there a link, in your
6 experience or in literature, between the use
7 or excessive use of alcohol and violence?
8 A It's extremely well known that
9 alcohol is a very common associated variable
10 to violent crime in the United States.
11 Q Now I want to turn back to the
12 2001 MDMA study that the Sentencing Commission
13 considered. Okay?
14 A Okay.
15 Q Now, that study expressed concern
16 that MDMA use was exploding among late teens
17 and early adults. Is that concern still
18 accurate today?
19 A That concern is not accurate.
20 There's patterns and trends and use, and the
21 government has done an excellent job in
22 surveilling the country year to year to the
23 March of the Future Studies of Johnson and
24 colleagues out of Michigan, as well as
25 substance work with the National Household

2 Drug Use Survey that they've been doing for 30
3 plus years. And, in fact, I believe the
4 Department of Justice issued in 2013 a drug
5 assessment in which the data that I just
6 mentioned showed a decline in use year to
7 year, since I believe the most recent data
8 was -- in that survey was data from 2010 and
9 2011.
10 Q So if I understand you correctly,
11 ecstasy use has actually declined between 2011
12 and today or perhaps between 2010 and 2011?
13 A I believe in 2009, according to
14 the National Household Drug Survey, somewhere
15 around 1.1 million people had tried MDMA, and
16 in 2010 that reduced to roughly, I think,
17 around 950,000; and in 2011 a little bit
18 closer to 900,000, 920,000.
19 So it's gone down year to year.
20 Q So to your knowledge was this data
21 available or presented to the Court at the
22 McCarthy Hearing?
23 A I don't believe that specific data
24 was presented at the McCarthy Hearing, no.
25 Q Is there any information offered

2 by the Department of Justice, in the document
3 you were talking about, regarding the use
4 among teenagers and young adults?
5 A Yes. March of the Future data
6 focuses on surveying drug use of
7 eighth graders, tenth graders, twelfth graders
8 and 12 year olds also. And if I'm not
9 mistaken, I think they quoted data that showed
10 that youth, in general, that there is
11 around -- close to a 4 percent reduction with
12 use since 2010.
13 Q So is it your understanding at
14 this point, if you're trying to interpret all
15 this data, that ecstasy use has peaked?
16 A That ecstasy has peaked and, you
17 know, it has gone downward before and I
18 believe a couple of years it went up a little
19 bit. In general, overall, it's gone down. It
20 has gone down.
21 Q Okay. You mentioned earlier
22 emergency room visits. Is there a way to
23 obtain data regarding emergency room visits
24 for various substances?
25 A Yeah. The Drug Abuse Warning

2 Network, DAWN, is a database, a government
3 database that collects factors involved with
4 emergency room visits and it's just one
5 measure for when we look at that data,
6 specific to drug abuse, it gives us some --
7 some indications of, in the real world,
8 whether a drug is having -- has a dangerous
9 impact on our society as theorized -- as
10 hypothesized in some academic research.
11 Q And have you reviewed the most
12 recent literature regarding emergency room
13 visits for drug use?
14 A Yes, I've looked at this data.
15 Q Could you compare the data for
16 MDMA emergency room admissions to the data
17 related to cocaine and marijuana emergency
18 room related admissions?
19 A Yeah. I believe looking at the
20 DAWN data from, again, 2011, that we had about
21 22,000 emergency room visits, actually, for
22 MDMA. And for cocaine it was actually a
23 little bit over 500,000.
24 Q Based on your research in the
25 field and understanding of the data, is the

2 difference between 20,000 and 500,000 a
3 significant number?
4 A Yes, it's quite significant. In
5 that data, for example, you know, for those
6 emergency room data, you've got about 480,000
7 people showing up with marijuana. You've got
8 350,000 showing up for alcohol. So the fact
9 that there are half a million people showing
10 up for cocaine, the number one drug of abuse
11 associated with emergency room visits that
12 year, I'd say it is very hard to assert that
13 cocaine is safer than MDMA.
14 Q Of the people, of the 20,000
15 people that showed up to the ER related to
16 MDMA use, is there any way to determine how
17 many of them were also using alcohol?
18 A Yes. They also will include
19 alcohol, if it shows up. And I believe it's
20 about 40 percent of the time that alcohol was
21 present as well. And that's important,
22 because we know from some basic science work
23 that exposure to alcohol, with the presence of
24 MDMA, increases the blood level of MDMA.
25 And so a person may think from

2 prior experience that they have taken a,
3 quote/unquote, safe dose from their experience
4 of MDMA, even from a pill, a set of pills that
5 they have used previously, but in the presence
6 of alcohol there can be as much as a
7 20 percent increase in MDMA availability in
8 the bloodstream.
9 Q Okay. You talked about the visits
10 related to just these drugs at the ER. Is
11 there any way to determine or is there any
12 measure available to determine a percentage or
13 rate of self harm on these drugs? For
14 example, suicide or suicide attempt rates
15 related to these drugs?
16 And if that's not a clear
17 question, I can rephrase.
18 A So I believe that there is such
19 data on the -- on drug related suicide
20 attempts, that's part of why the non-database
21 exist. And so that ratio is calculated in the
22 database itself and so it gives a sense of
23 relative risk.
24 For cocaine it is a factor of
25 18.9, and with higher numbers the more

2 dangerous the risk. And it is not listed,
3 though, for MDMA.
4 Q And what does that suggest to you,
5 the fact that MDMA is not listed?
6 A That it's so rare and so -- it's
7 statistically near zero, as opposed to
8 cocaine, which basically, you know, is
9 significant.
10 Q Thank you. I'd like to turn now
11 to your field of research, as it stands now,
12 regarding potential damage or changes to the
13 brain secondary to MDMA use.
14 A Okay.
15 Q Have you heard the term
16 neurotoxicity before?
17 A Yes.
18 Q What do you believe the definition
19 of neurotoxicity is?
20 A Well, it's ill-defined and it is
21 one of these terms used loosely in scientific
22 literature. It's very hard to differentiate,
23 for example, brain change from brain damage.
24 And one of the most important ways to look for
25 evidence of toxicity is showing that there's

2 some functional impact that can be associated
3 to the use of a drug or patterns of behavior
4 of other substances. And so -- but for me I
5 would say probably one of the most important
6 ways of looking at neurotoxicity would be
7 actually neuron death, the killing of the
8 actual cell. MDMA is not associated with
9 killing.
10 Q So if we're using the definition
11 of -- applying the definition of
12 neurotoxicity, if we use the definition of
13 neuron death, does MDMA have a neurotoxicity
14 effect?
15 A If we're saying neuron death, the
16 answer would be no, it does not do that.
17 Q Let's broaden it a bit and talk
18 about significant cognitive impairment. Have
19 you done any research regarding whether MDMA
20 use at any level causes significant cognitive
21 impairment?
22 A Yes.
23 Q Can you tell us about that
24 research?
25 A Yes. I've completed one of the

2 largest studies ever. And the most -- really,
3 the largest study of its kind, funded by the
4 National Institute of Drug Abuse on removing
5 the types of damaging compounds in the
6 literature that exist that are highly
7 problematic in almost all the other
8 literature. So it was a more tightly designed
9 study fixing the methodological failures of
10 what existed in the literature, as well as
11 being almost sort of a magnitude larger. It's
12 the largest study that's completed, I believe,
13 in the United States.
14 Q Okay, let me stop you there,
15 because I want to break that down a bit.
16 You mentioned compounds. How
17 would you explain that word, compound? What
18 does that mean?
19 A In general, there is never a
20 perfectly designed study. And while lawyers
21 may pick apart this weakness, that weakness,
22 in science we know it's virtually impossible
23 to design a perfect study. And so those
24 problems can be so significant as to decrease
25 our confidence in the value of the findings.

2 So there's no compounds, in a sense that
3 compounded data may invalidate the data,
4 there's even unknown compounds, things we
5 don't know is doing what.
6 But there are things that are
7 obvious to science that would make for a
8 stronger study, and some of these things were
9 not attempted prior because people have
10 assumed that it would be near impossible to
11 do; whereas, with funding from the government
12 we were able to importantly evaluate this
13 question again of what's the cognitive impact
14 of MDMA.
15 Q Okay. So in the interest of time,
16 I'll ask you some more pointed questions about
17 compounds. It sounds like basically what
18 you're trying to do with these studies is to
19 determine the effects of MDMA on cognitive
20 functioning. Is that right?
21 A As best as we can for the study,
22 yeah.
23 Q Now, it sounds like this is
24 something that could be difficult to do. Is
25 that fair to say?

2 A That's correct.
3 Q And is that because it's --
4 A Well, because the very best and
5 most accurate way would be that you have a
6 study subject staying within a laboratory, and
7 then we give them a known amount of pure MDMA
8 and we do that over time, and then we control
9 all those factors. We know how long they're
10 sleeping for. We know that they're not
11 ingesting other substances. And we know that
12 they truly are ingesting MDMA.
13 So using drug users from the
14 community is less accurate than doing that.
15 Obviously there's ethical problems with doing
16 what I just described. So we do the next best
17 thing. We use real world users for these
18 tests.
19 Q Are there problems associated or
20 compounds associated with questioning drug
21 users in the community, without bringing them
22 into a laboratory?
23 A There's multiple. And those
24 problems are not addressed by the vast
25 majority of the literature. Those problems

2 are inadequate control for sleep depravation.
3 Because people who are users go to all night
4 dance parties. And if they go and get tested
5 while they're sleep deprived, we know that
6 they will do worse; whereas, a comparative
7 group of, say, college-age kids that are going
8 to parties well rested, they wind up doing
9 better. Not because they're free from ecstasy
10 exposure but because they're better rested.
11 Another would be inadequate control for other
12 drugs of abuse, an inadequate washup period
13 from last use.
14 The failure to do drug testing and
15 the kind of neuro cognitive testing that would
16 ensure that the person hasn't ingested MDMA in
17 the prior three days and haven't recently used
18 other drugs of abuse, you can do a hair
19 analysis for drugs, to both confirm the
20 presence of MDMA, and also the absence of
21 other drugs, just to confirm the histories
22 that they provided in their psychiatric
23 interview.
24 Q Okay, let me stop you there.
25 Have other researchers tried to

2 control or exclude these compounds from their
3 studies?
4 A As far as I know, my two studies
5 are the only ones of the kind that addressed
6 all of those elements.
7 Q And are there other studies that
8 perhaps have -- strike that.
9 Is there an additional compound
10 related to prior drug use? If we're talking
11 about brain imaging, how would prior drug use
12 before any involvement in the clinical study,
13 how would that be a possible compound?
14 A A significant one. Because we
15 know that the drugs of abuse do impact on --
16 on the brain. And so if these imaging
17 studies, poly drug abusers, one group who have
18 used more ecstasy than the other group or the
19 other group is poly drug abusing and hasn't
20 used ecstasy, that is not the same thing as
21 evaluating somebody who's just been exposed to
22 ecstasy, so that we can narrow it down and
23 have a pathology to identify ecstasy.
24 Instead, we have a question as to how much
25 confidence do we have in these statistical

2 measures that are used to control for that
3 compound.
4 Q You mentioned that you did one of
5 the largest studies of this kind or perhaps
6 the only study with MDMA that removed or
7 accounted for these compounds. What were your
8 results? Could you discuss your findings?
9 A So in a data of a couple of
10 hundred people, all were from the dance party
11 scene, we found no difference in cognitive
12 performance on any of the exhaustive measures
13 administered when we compared globally the
14 users to the non-users.
15 When you do a post testing split
16 of the data to create a group of moderate
17 users of MDMA, those who have used it 20 to 55
18 times and those that are characterized as
19 heavy users, those who have used it
20 essentially more than 50 times, several times
21 in their life, we do find some differences in
22 performance, impulsivity and some other
23 measures, like the finger tapping test.
24 But what's interesting is a number
25 of them showed some trends or statistical

2 significance only in the moderate users, not
3 the heavy users. And so that really reduces
4 our concern that what we're finding is
5 associated then with MDMA, maybe due to
6 another factor not yet identified. But, in
7 fact, the first study that we had published
8 found impulsivity, and that concern is
9 associated with the function of serotonin
10 turnover, and we did publish on that. But
11 then when we got -- and that's like 20, 30, 40
12 people, like most of the other literature out
13 there that finds problems. But when we
14 greatly expanded the study to a couple hundred
15 people to peer that finding, it didn't hold.
16 So you can have sometimes these
17 statistically significant findings, but it may
18 be a function that data is compound. In
19 almost all of the literature, you know, ten to
20 40 people, it may be inadequate for capturing
21 the truth. You may find the people that are
22 initially screened are the ones having the
23 most problems or the most curious to volunteer
24 for studies is a compound that you wouldn't
25 even consider unless they're trying to get a

2 much larger data set, which fortunately
3 neither would be of importance to obtain.
4 Q So if I understand that correctly,
5 Doctor, you did at least two studies regarding
6 subjects in their use of MDMA and cognitive
7 effects. Correct?
8 A Yes, with relatively pure users of
9 MDMA who had little to no exposure to other
10 intoxicants, including alcohol.
11 Q Now, how did the findings -- you
12 mentioned impulsivity and finger tapping
13 tests. How did your findings from the first
14 test differ from the --
15 A First people showed some of the
16 measures on the -- on a test measure that
17 actually is designed for evaluating brain
18 trauma used prior to -- prior to our work
19 for -- with drug abuse. But some of the
20 measures showed an impulsive strategy in
21 attacking the procedure of basically sorting
22 cards and counting them in a timed fashion.
23 But in a larger study it wasn't replicated, it
24 did not show that. This work is relatively
25 exclusive to users of ecstasy, and actually

2 was done twice by us, two different studies.
3 Q So based on your two studies, if
4 we can extrapolate some conclusions from that
5 regarding the use of MDMA, moderate to what
6 sounds like fairly high use of MDMA, did you
7 conclude that there is significant deprivation
8 or significant decline in cognitive
9 functioning, secondary to MDMA use?
10 A No, we did not find any ominous
11 concerning results. We did not find anything
12 that would support that there is a clinically
13 significant or a functional impact on
14 performance by those individuals who
15 participated in this work from MDMA.
16 Q Was this work published in a peer
17 review journal?
18 A Both were published in peer review
19 journals. I believe the first one was
20 published in Drug and Alcohol Dependents and
21 the second one was published in Addiction, two
22 of the top journals of substance abuse in the
23 field of research.
24 Q Now, with respect to your second
25 article, that was the one that was published

2 in Addiction. Correct?
3 A Correct.
4 Q The government has put forth
5 before the Court an exhibit, a response to
6 your position from -- it looks like that was
7 also published in that journal. Have you
8 reviewed that?
9 A Of course.
10 Q And have you replied to that, in
11 the journal?
12 A Yes, we did.
13 Q Was the reply published?
14 A You know, we explained quite
15 clearly. I mean, I can go through it point by
16 point, if you want. But we had the last word,
17 in a sense. None of those authors decided to
18 try to retackle what we understood our data to
19 show.
20 Q Let me stop you there, just
21 because some of us are not familiar with the
22 field of research in publications. A peer
23 review journal allows responses and rebuttals.
24 Is that fair so say?
25 A That's correct.

2 Q Okay. So there was a response to
3 your position and that was the one that was
4 put before the Court as an exhibit. You
5 replied to that. Correct?
6 A Yes. And any legitimate fact
7 finder has to review all of that. You can't
8 just pick and choose what you like. You can't
9 cherrypick. You can't just cite letters which
10 are not -- which is not actual research,
11 trying to pick apart our findings and then
12 fail, utterly fail to evaluate our response to
13 those letters. That's basically below
14 standard, I would say, for any expert witness
15 to do. That's just not competent work.
16 Q And your response was published in
17 what year?
18 A It was published right alongside
19 those letters.
20 Q Okay.
21 A So in 2011 our response to
22 Dr. Parrot, Dr. Kish, and Dr. Rogers, are
23 comprehensive responses to the issues that
24 they raised, appeared right alongside their
25 letter. So anybody who would cite those

2 letters and not take the time to evaluate our
3 response is -- should call into question
4 whether anything should be believed by that
5 person, in my opinion.
6 Q Have there been any new studies
7 involving new -- new participants, new data
8 stats, new brain imaging, new comprehension
9 responses is what I'm getting at, since your
10 2011 study involving the cognitive effects of
11 MDMA?
12 A There has been one study in the
13 Netherlands, of college kids, both prior to
14 drug use and the years to follow. We
15 interviewed them and then identified those
16 people who were new to ecstasy. And so there
17 has been some additional work published since.
18 Q Since you published your 2011
19 article?
20 A I believe the next MDMA data was
21 published roughly around the same time, 2011,
22 and then forward.
23 Q Doctor, are you familiar with a
24 researcher whose last name is Parrot, in the
25 field of MDMA research?

2 A Yes, I know him well.
3 Q And has he published anything
4 since 2011 regarding MDMA use?
5 A Yes. He is often writing opinion
6 pieces and reviews and I believe offered
7 another review that was published in 2013.
8 Q I want to talk to you about that
9 review in 2013. You've read it before?
10 A I have.
11 Q Is this review based on any new
12 studies? And what I mean by "new," I mean
13 after 2011?
14 A No, it's not.
15 Q Is it just a review of studies and
16 literature that was published before 2011?
17 A That's correct.
18 Q How has that paper been accepted
19 in the scientific community?
20 A Well, something remarkable and
21 very rare has happened. The Human Psychology
22 received for peer review a very detailed
23 critique of Dr. Parrot's 2013 paper,
24 completely taking him to task for that
25 review's failure to address fully the

2 literature and cherrypicking over studies that
3 would be in opposition to the points that he
4 was raising and that had led to his
5 miscitation and/or misdescription of other's
6 work. That was published recently, in 2014.
7 MR. SCOLNICK: Okay. Before we
8 get into that in more detail, I'm
9 offering into evidence now what's
10 Defendant's Exhibit B, which is your
11 response to Parrot, Fisk and Rogers et
12 al. I've given a copy of this to the
13 Government.
14 (Defendant's Exhibit B so marked.)
15 Q Moving on to what we just talked
16 about, this article that was published,
17 critiquing or criticizing Parrot's work. I
18 quote, Parrot's review frequently exaggerates,
19 misrepresents or omits research findings.
20 Are you familiar with that
21 provision in this 2014 article?
22 A Yes. And I'm stunned when reading
23 it. Because normally -- you know, very
24 specific language like that is reserved for an
25 editorial or a letter to the editor, but this

2 actually appears within a peer reviewed
3 article. So I took greater significance from
4 that, especially since published in the very
5 same journal that Dr. Parrot's 2013 review was
6 published in.
7 Q Is this the latest word, this
8 article that we're talking about here, on
9 Parrot's research?
10 A I believe so.
11 MR. SCOLNICK: I'd like to offer,
12 as Defendant's Exhibit C, an article
13 entitled: A Reconsideration and
14 Response to Parrot 2013, quote, Human
15 Psychobiology or Ecstasy, an overview of
16 25 years of empirical research. And
17 this has been provided to the Government
18 before today.
19 (Defendant's Exhibit C so marked.)
20 Q Do you agree with the conclusions
21 of this 2014 article?
22 A I do.
23 Q There have been a number of
24 studies that have found some brain changes
25 relating to MDMA. Correct?

2 A Correct.
3 Q And to summarize your
4 understanding of the state of the field right
5 now, is there any research, reliable research
6 or findings that have confirmed significant
7 cognitive impairment secondary to ecstasy use?
8 A I'm not aware of any research that
9 shows clinically meaningful impairment from
10 MDMA abuse.
11 Q Could you explain that, what do
12 you mean by clinically -- significant, I think
13 you said?
14 A Clinically meaningful. So
15 something that can take on statistical
16 significance. The fact that a person may
17 perform a few milliseconds to a few seconds
18 slower than somebody else may take on a
19 statistical significant study, that the
20 difference between the two really identifies
21 one group over the other. But that -- but
22 both measures, both results could be in the
23 functionally normative range of performance.
24 So merely finding that we have a
25 statistical significant decrease in

2 performance is insufficient to take away a
3 message that MDMA will damage your performance
4 in everyday life.
5 Q I only have a few more questions.
6 We need to turn it over to the Government to
7 give them an opportunity to question you here.
8 But regarding these findings, the clinically
9 insignificant decrease in performance.
10 Are there any other drugs, legal,
11 either by over-the-counter or prescription
12 drugs, that have a similar effect; meaning,
13 decrease in performance to MDMA?
14 A Yes.
15 Q Could you explain what those drugs
16 are?
17 A Well, for example, much has been
18 claimed that MDMA use may cause verbal memory
19 deficits, with other measures of how we access
20 language. And we already know that Vicodin,
21 Clonidine, those sorts of drugs, all of them
22 do that. All of them can cause verbal memory
23 deficits. In other words, if we're concerned
24 about, like I said, neuron death, alcohol
25 causes neuron death. I don't know if I can

2 clarify that, but MDMA does not cause neuron
3 death.
4 Q Now, comparing MDMA to alcohol,
5 would you say that alcohol causes
6 significant -- significantly more brain damage
7 than MDMA?
8 A Well, having done a different
9 study, looking at the long term neurocognitive
10 functional consequences, in this case its
11 comparison of those who follow the native
12 American church. One of the comparison groups
13 was native Americans who had been daily heavy
14 drinkers of alcohol and were now sober. And
15 there has been extensive and exhaustive
16 literature showing significant cognitive
17 damage from alcohol, all of which is nowhere
18 near realized in any of the data for MDMA.
19 It's just remarkably damaging to cognitive
20 function when a person is pathologically
21 addicted to alcohol.
22 Q Thank you. Just one other area.
23 In 2011 the judge in the McCarthy
24 case was concerned about the fact that MDMA
25 was, I believe the quote was, aggressively

2 marketed to children and young teens. I might
3 be misquoting it, but that was the idea.
4 Do you think that that concern is
5 still a valid one at the present time?
6 A Well, marketed, you know, how and
7 by who? Since 2011 electronic dance music has
8 become more popular. Some of that music has
9 messages of drug use. It's quite typical in
10 pop culture to include the use of MDMA. But
11 that's not marketing specific to entice people
12 to use, you know, by drug dealers.
13 But separate from what's popular
14 in entertainment, I would say no, it's not
15 aggressively marketed, if -- or it's
16 ineffectively marketed. Because as we started
17 out with -- with earlier questions, we have
18 government data showing that use has
19 decreased, not increased.
20 Q And in your experience dealing
21 with teenagers or young adults who are abusing
22 MDMA, is it your experience that they have
23 used marijuana at the same time or prior to
24 using MDMA?
25 A It is quite common that people

2 will have abused multiple drugs. The
3 consumption of alcohol from the age of 21 is
4 also an elicit activity. It's to be expected
5 that most youth will have broken the law and
6 gotten intoxicated with alcohol as well. So,
7 yes, since marijuana is the most abused
8 elicited substance, other than alcohol, it
9 would be common to expect that they've also
10 been smoking marijuana.
11 MR. SCOLNICK: Thank you. And
12 then just before we finish, I want to
13 admit as Defense Exhibit E, the study
14 discussed from Scotland which is
15 entitled: Quantifying the RR of harm to
16 self and others from substance misuse:
17 Results from a survey of clinical
18 experts across Scotland. That was the
19 article --
20 THE WITNESS: I'm sorry, I forgot,
21 yeah.
22 MR. SCOLNICK: Okay. And with
23 that, I turn it over to the Government.
24 (Defendant's Exhibit E so marked.)
25 EXAMINATION BY MS. MOORE:

2 Q Good morning.
3 A Good morning.
4 Q I just want to clarify a couple of
5 matters you discussed with Mr. Scolnick.
6 You mentioned emergency room
7 visits. Were the numbers that you gave us
8 total visits? For instance, the 22,000 for
9 MDMA, that would be total emergency room
10 visits?
11 A This is looking at the most recent
12 non-data that was published, yeah. So this is
13 from --
14 Q To total reported visits?
15 A -- 2011, drug related emergency
16 department visits.
17 Q Those were the total reported
18 visits?
19 A Total reported visits to the
20 emergency room department for any elicit drug
21 for that year was ranked at 1,252,000.
22 Q Okay. And then for each of the
23 drugs, the number of visits that you gave us
24 was just the total visits not a percentage of
25 users of that drug who had visited the E.R.

2 Correct?
3 A There is both the wrong number of
4 emergency department visits, as well as a
5 percent of E.D. visits. The numbers that I
6 was using was the number, not the percent.
7 Q But the percent you're talking
8 about there, is the percent of total emergency
9 room visits for one particular drug, not
10 percentage of users of a drug who end up in
11 the emergency room. Correct?
12 A That's correct. In order to do
13 that, what we could do is look at the National
14 Council Survey data of total users estimated
15 in the country, and then we could factor in
16 the number of emergency room visits to that
17 number to get an estimate of how many users
18 overall wind up in an emergency room. And I
19 believe that number would be quite small for
20 MDMA in comparison to cocaine.
21 Q Do you have that data?
22 A The government doesn't publish
23 data that crosses it. I actually have
24 chapters I wrote. I think I actually did do
25 that comparison. It's not at my finger tips.

2 But I remember from my numbers that I just
3 described, that MDMA was much, much lower than
4 cocaine.
5 Q You mentioned before, when you
6 were discussing cocaine, powdered cocaine
7 versus crack cocaine, when you were discussing
8 cocaine more broadly during your discussions
9 with Mr. Scolnick, was your use of the word
10 cocaine exclusive to powdered cocaine or was
11 it including both: The powder and the crack?
12 A It included both.
13 Q I'm sorry, I couldn't hear you?
14 A Yes, both.
15 Q So every time you talked about the
16 harmful nature of cocaine, you're talking both
17 powdered cocaine and crack cocaine?
18 A That's correct. They're both of a
19 significant greater risk, in my opinion, than
20 MDMA, whether you separate them or not.
21 Q Turning to your 2011 study. The
22 median lifetime uses of MDMA in your study was
23 43.5. Right?
24 A Correct.
25 Q And are you aware that other

2 studies have suggested that MDMA users take
3 approximately 200 tablets over a lifetime.
4 That's average?
5 A That's the number of instances of
6 MDMA ingestion, that's not the number of
7 pills.
8 Q Do you have a number for average
9 use of pill usages?
10 A If you give me a second I can give
11 you that data. I'm still looking for my
12 actual paper. So data published in 2011 just
13 offered the number of separate instances. The
14 median number of pills, I'm fairly certain it
15 was over 100 pills. I'm looking to see if
16 it's also in our response to Dr. Parrot. I'm
17 not finding it. But it was significant. It
18 was certainly of a similar magnitude of pills,
19 especially heavy users.
20 Q Okay. That's fine.
21 A I'm sorry. I believe our largest
22 user had ingested MDMA on more -- with more
23 than 400 pills.
24 Q Okay. Are you aware that Kish
25 published a study in 2010 and found that MDMA

2 results in toxic outcomes to serotonin neurons
3 within the cortex and hippocampus among other
4 areas?
5 A I'm aware that Kish -- that the
6 Kish 2010 imaging study have, yes, decreased.
7 But importantly, unlike what was found on
8 McCann in 1998, there is an official serotonin
9 transporter throughout the brain and that's in
10 the very same paper that you cited. And then
11 if you turn to some of the other researchers
12 that show that sert can rebound over time
13 because there's a very large range in the sert
14 binding. So, again, what's -- the fact that
15 there's a declarant like that found is enough
16 to serve that its of clinical importance with
17 some drugs that do much the same that are --
18 that are actually approved.
19 Q Okay. Were you aware that McCann
20 published a 2008 piece that found a
21 correlation between reduced sert binding and
22 neurocognitive deficit in MDMA user's
23 maintenances?
24 A I am aware of that paper but we
25 also know that sert binding detriments are not

2 permanent.
3 Q Okay. Are squirrel monkeys
4 closely related physiologically to humans with
5 regard to metabolizing MDMA?
6 A We know that using monkey primates
7 is for clinical, for preclinical research is
8 going to give more, in general, more accurate
9 data for us, and that the metabolic -- the
10 metabolism of MDMA in nonhuman primates is
11 going to approximately give a use.
12 Q Okay. And are you aware that in
13 testing the effects of a single oral dose of
14 MDMA, Cowan et al in 2007 found that it
15 produced a significant dose related depletion
16 of serotonin and metabolite 5-HIAA in the
17 cerebral cortex, hippocampus, and thalamus of
18 the squirrel monkeys?
19 A Sure. Using doses that might not
20 scale to human, because we wanted animals to
21 actually give a dose that will achieve a toxic
22 finding. But that doesn't mean that it is
23 consistent with what most humans do in their
24 abuse of the drug. And also it's -- what's of
25 interest is what happens over time. We could

2 survive acute exposure of the brain to a
3 substance that's going to alter brain function
4 and brain chemistry during testing. During
5 that acute phase it's most likely to realize
6 detriments in performance and detriments in
7 brain measures such as that. But what happens
8 over time, what's the functional significance
9 of that? That's the more pressing question,
10 in my opinion.
11 Q Okay. Well, are you aware that in
12 2010 Kish published a study examining users of
13 approximately 200 lifetime doses of MDMA and
14 found that there is an inverse relationship
15 between the length of MDMA use and sert
16 binding reduction?
17 A I'm aware of his findings. I'm
18 also aware that Dr. Kish is -- I mean, I hate
19 to put words into his mouth. Let me just be
20 accurate about this. Kish is not raising red
21 flags that we've got a dangerous and
22 neurotoxic drug in MDMA even from his 2010
23 findings. Maybe Dr. Parrot is somebody who
24 likes to cherrypick like that. But no, even
25 Dr. Kish does not validate that conclusion and

2 nowhere does any physician say that it is as
3 dangerous as cocaine. So it's very
4 concerning. It's a very concerning thing.
5 Q Are you aware that this study
6 identified deficits including -- and forgive
7 me, I'm probably going to pronounce this
8 wrong -- serotoninergic neurotoxicity?
9 A Well, fortunately it doesn't do
10 the neurotoxic thing that alcohol does of
11 actually killing brain cells. So what we call
12 reformation of detriment extending from
13 serotonin after exposure from MDMA to be,
14 quote/unquote, neurotoxic if you want to do
15 that. But those very same changes in monkeys,
16 in humans, were well known by FDA when they
17 considered and approved the drug phenformin,
18 which was at market. So those very changes
19 that you're describing right now have in the
20 past been considered by the FDA and they still
21 went ahead and approved the drug any way.
22 Because when you have known
23 medical benefits for a drug, you can also give
24 a form of consent that there may be some
25 problems. There's many drugs that cause some

2 inherent cognitive function. If you're dying
3 of brain cancer and I give you a highly toxic
4 dose of chemotherapy that gives you five more
5 years of life but shaves five points off your
6 IQ, I bet you take it.
7 We're not going to prevent you
8 from having that life-saving drug even though
9 it may impact your cognitive performance. We
10 have a drug that doesn't have any supplemental
11 utility. Any of these findings from a
12 clinical perspective can be milked by those
13 who want to lie to the public in asserting
14 that actual MDMA is a greater danger to our
15 public health than cocaine.
16 Q Are you aware that Jacobsen, in
17 2004, showed that MDMA users had demonstrated
18 abnormal function of the hippocampus during
19 memory function tests?
20 A I would need to see that actual
21 paper just to refresh my memory. I'm sure
22 what we're looking at, all these studies with
23 tons of compounds in them, in a control for
24 past drug use and incentivized that's rather
25 small in making it very difficult to

2 extrapolate risk for the public at large. But
3 sure, I'm -- I would expect that there can be
4 such findings, yes.
5 Q Okay. And are you aware that
6 Von Geusau, in 2004, also showed significantly
7 worst performance of male MDMA users on task,
8 that correlate to cognitive flexibility and on
9 the combined executive function test?
10 A Yeah, and that's an example of the
11 type of weak literature that exist. Why we
12 were funded to do the work that we did. You
13 know, obviously if I had just found more harm,
14 it would have been great for me to get more
15 funding to just continue to do that. But I
16 just honestly published my findings that we
17 had. But small studies like the one you just
18 cited are not of significant value compared to
19 my own published work.
20 Q All right. Are you aware that
21 Jager, in 2008, found using the FMRI, that
22 MDMA was associated with reduced associative
23 memory performance?
24 A Again, there are multiple
25 compounds in that work that show they were

2 removed to have real confidence. That what we
3 have is a finding of public health
4 consequence. It's concerning, there's no
5 doubt about that. But what's the functioning
6 take home message from it, is it's still
7 controversial. And the fact that this
8 controversy has remained for such a long time
9 points to the weakness of the underlying
10 argument that MDMA is the clear and present
11 danger as being attempted by the government
12 still, and quite sadly.
13 But it's important for -- I mean,
14 put it this way: I have yet to interview a
15 single drug user that thinks that a drug is
16 safe. No user thinks that. But this message
17 is being promoted that if we talk about
18 relative risk then we may be assuring safety
19 to some people. I have never, I have never
20 once said that MDMA is safe. I prefer that
21 people don't abuse drugs, including MDMA.
22 Since we're in a world where
23 people can still obtain them, we have to
24 accept that some drugs are going to be more
25 dangerous than others and it would be wise for

2 us to target those drugs that are doing the
3 most damage to our society, which we're not
4 quite doing.
5 Q Are you aware that according to
6 NIDA, affects of acute or short-term cocaine
7 use are usually reserved to clinical symptoms?
8 A I didn't hear the second part.
9 Are usually what?
10 Q Reserved to clinical symptoms.
11 A I'm not sure what you're saying.
12 Q Such as tachycardia or seizures or
13 increased blood pressure, things like that.
14 A Or as I described, you know,
15 having a heart attack also causes cognitive
16 deference in performance, in carrying oxygen
17 to the brain. So from a medical standpoint as
18 a physician, we can -- what we care about are
19 the actual people and whether the risk is
20 directly related to the drug or indirectly
21 related through the pattern of abuse. In the
22 end it's still harming the same person.
23 And when we look at that real
24 world situation, there's not a single
25 physician I know of who would ever agree with

2 the government's position or the U.S.
3 Sentencing Commission's position that cocaine
4 is a substantially safer drug from MDMA. This
5 may be one of the most dangerous public health
6 messages that the government is allowing to
7 continue to stay.
8 Q Are you aware that taurine is a
9 neuro-protective amino acid that reduces the
10 excitatory actions of the brain and protects
11 against -- excuse me, I'm probably pronouncing
12 this wrong -- dopaminergic neurons?
13 A Dopaminergic neurons, yeah.
14 Q And are you aware that
15 Yablonski-Alter, in 2009, found that while
16 neurophysiological changes can begin to occur
17 following continued use of cocaine, repeated
18 cocaine administration also results in the
19 release of taurine?
20 A Which that points out to just how
21 toxic cocaine is since we see victims of
22 stroke induced from cocaine and from people
23 after their heart attacks, that the brains
24 aren't functioning like they used to. That
25 points out even more how dangerous cocaine

2 must be that it can release something
3 neuro-protective and yet we see clinically all
4 the time these severe damages from cocaine
5 never, never seen on a routine basis like
6 cocaine with MDMA. It's really sad.
7 Q Were you aware that subsequent
8 cocaine use has been shown from Nestler, in
9 2005, to result in an increase in dendrites?
10 A I guess that would be an example
11 of neurotoxicity. Right? Because that's
12 brain change. You can't just cherrypick and
13 say that the reformation of dendrites from
14 neurons, MDMA, causes brain damage when you're
15 now citing a paper.
16 So to repeat myself, if we follow
17 the logic that alteration of the expression of
18 dendrites from MDMA is, quote/unquote,
19 neurotoxic, then the alteration of dendrites
20 from cocaine to increased expression of
21 dendrites, this too must be an example by that
22 definition of neurotoxicity.
23 Q Turning to the paper that you
24 spoke with Mr. Scolnick briefly about, it's
25 titled: The Reconsideration and Response to

2 Parrot, best beginning of it.
3 Are you aware that the authors of
4 this piece listed a conflict of interest in
5 their paper?
6 A Yes.
7 Q Because two of the authors are
8 affiliated with MAPS as the executive director
9 and as a clinical research and information
10 specialist. Right?
11 A Yes, I'm aware of that.
12 Q And are you aware that developing
13 MDMA into an FDA approved prescription is MAPS
14 top priority?
15 A I can't speak to their -- their
16 direct agenda or top priority, since I'm not a
17 member, a person who is running MAPS or
18 anything like that. I'm not a MAPS
19 researcher.
20 Q Are you aware that that is
21 something that MAPS is interested in, whether
22 or not --
23 A Oh, yeah, of course. Of course.
24 Q And then turning to the Nut piece.
25 In that article you're aware that the

2 researchers discussed the limitations in their
3 papers. Right?
4 A All good studies should do that,
5 yes.
6 Q And in this paper the authors
7 noted that many of the harms of drugs are
8 affected by their availability and legal
9 status, which varies across countries. So our
10 results are not necessarily applicable to
11 countries with very different legal and
12 cultural attitudes to drugs. Right?
13 A Well, you know, it's nice to see a
14 discussion that includes such a statement.
15 But the fact is, is that Great Britain is a
16 member of international psychotropic treaty,
17 just like the United States, and is subject to
18 the same international conventions as the
19 United States for the control of drugs listed
20 as, you know, Schedule I in the United States,
21 Schedule A in Great Britain. And there is a
22 significant overlap in our western societies.
23 So it's -- it's doubtful that such a concern
24 would be of significant relevance as here in
25 the United States.

2 Q Okay. And the researchers also
3 noted there that a low score in their
4 assessment didn't mean that a drug wasn't
5 harmful. Correct?
6 A Absolutely, that's correct.
7 Absolutely, that's true.
8 Q All right. I have --
9 A Nobody should take that message
10 that a drug is safe. There's no drug that's
11 safe.
12 MS. MOORE: All right, thank you.
13 I don't have any more questions.
14 EXAMINATION BY MR. SCOLNICK:
15 Q Just a couple further questions,
16 Doctor.
17 The government discussed with you
18 a number of studies. It sounds like those
19 studies occurred between 2004 and 2010. Is
20 that right?
21 A I believe so. A number of them
22 were.
23 Q Well, we talked about Kish,
24 McCann, Jacobsen, Jager, Von Geusau?
25 A Yeah, yeah, that's right.

2 Q All of this information was
3 available before 2011. Right?
4 A That's correct.
5 Q And these aren't the only studies
6 in the field of MDMA cognitive research, are
7 they?
8 A No, there's thousands of papers on
9 MDMA.
10 Q And are there a number of studies
11 that agree with your findings?
12 A There are a number of studies that
13 agree with our findings. The work of Gill and
14 Magetty was published, I think, subsequent to
15 my work. And Dr. Michael Laverse from
16 Australia has published some evidence similar.
17 And there have been other groups as well that
18 have done some -- some overlap with the
19 results that we report, but none of them are
20 with the number of individuals or the control
21 for the compounding variable that I mentioned
22 quite like the work that was published in
23 2011, which I believe still should be
24 considered the standard reference by which we
25 should look at this question, although

2 controversial, of what happens when people who
3 abuse MDMA and their cognitive performance.
4 Q And with respect to the issue of
5 significant cognitive impairment, secondary to
6 MDMA use, what is your opinion and conclusions
7 of the vast majority of MDMA researchers?
8 A That there are some findings that
9 are -- that raises concern and warrant
10 continued investigation, as well as
11 surveillance of those who are MDMA users. But
12 it remains controversial to assert one
13 physician over the other as still enough basic
14 and clinical research to point to some
15 deference in performance which are not, right
16 now, found to be of significance but that's
17 still hurtful. It needs to be looked at.
18 But there is no data that is
19 supportive of identifying MDMA as being a
20 concerning drug to people's cognitive
21 functioning nor is there data to warrant at
22 this point the assertion that MDMA is more
23 dangerous than cocaine or that MDMA is even an
24 equivalent danger to MDMA. So we have a
25 tremendous amount of data showing that cocaine

2 is indeed more dangerous than MDMA.
3 I don't know any doctor that would
4 oppose that statement about MDMA versus
5 cocaine. Not a single physician could, have I
6 ever found, and I ask this a lot, that finds
7 cocaine safer than MDMA. It's just absurd to
8 ever proffer such a conclusion at this point
9 of what we know, both clinically and in
10 scientific literature. That is conclusive.
11 (Continued on the next page.)
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2 MR. SCOLNICK: Thank you, Doctor.
3 I have nothing further.
4 (Whereupon, matter concluded;
5 time noted: 12:06 p.m.)
6
7
8
9 _____
10 DR. JOHN HALPERN, M.D.
11
12 Subscribed and sworn to before me
13 this _____ day of _____, 2014
14 _____
15 NOTARY PUBLIC
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1
2 C E R T I F I C A T E
3
4 STATE OF NEW YORK)
5 :SS
6 COUNTY OF NEW YORK)
7 I, CHARISSE KITT, a Notary Public
8 for and within the State of New York, do
9 hereby certify:
10 That the witness whose examination
11 is hereinbefore set forth was duly sworn and
12 that such examination is a true record of the
13 testimony given by that witness.
14 I further certify that I am not
15 related to any of the parties to this action
16 by blood or by marriage and that I am in no
17 way interested in the outcome of this matter.
18 IN WITNESS WHEREOF, I have
19 hereunto set my hand this 29th day of August,
20 2014.
21
22 _____
23 CHARISSE KITT, CRI, CSR, RMR, FCRR
24
25

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IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF HAWAII

UNITED STATES OF AMERICA, Plaintiff, vs. AUSTIN-ERNEST KAHOLO HOLMES, Defendant.	))))))))))	CR. NO. 15-00245-01 SOM CR. NO. 15-00410-01 SOM ORDER DETERMINING THAT, FOR PURPOSES OF CALCULATING THE SENTENCING GUIDELINE RANGE, METHCATHINONE IS THE LISTED DRUG MOST CLOSELY RELATED TO ETHYLONE

ORDER DETERMINING THAT, FOR PURPOSES OF CALCULATING THE SENTENCING GUIDELINE RANGE, METHCATHINONE IS THE LISTED DRUG MOST CLOSELY RELATED TO ETHYLONE

This court is asked to determine which drug listed in the Drug Equivalency Tables of § 2D1.1 of the United States Sentencing Guidelines is most closely related to ethylone, a drug not mentioned in the Sentencing Guidelines. Having heard from dueling scientists during two days of testimony, this court agrees with Defendant Austin-Ernest Kaholo Homes that methcathinone is the listed drug most closely related to ethylone.

This conclusion relates solely to the calculation of the guideline range applicable in this case, not to whether, once the guideline range has been determined, there may or may not be good reasons for this court to vary from that guideline range, a matter the court will address at an upcoming hearing. That is, this court is not here addressing any challenge to how the Sentencing Guidelines characterize methcathinone or any argument

as to how this court should ultimately treat ethylone, although the court fully expects such challenges and arguments to be raised in connection with a defense request for a variance from the guideline range.[1]

I. BACKGROUND INFORMATION

Pursuant to a plea agreement, Holmes pled guilty to possessing ethylone with intent to distribute it, possessing a semi-automatic pistol while being an unlawful user of a

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[1] While recognizing that the evidence presented in connection with the guideline calculation issue is related to the variance issue, the court is at pains to distinguish between the two. The variance issue involves considerably more discretion than the guideline calculation. See Spears v. United States, 555 U.S. 261, 264 (2009); Kimbrough v. United States, 552 U.S. 85, 102-10 (2007). Prior to the present case, this judge's involvement with challenges to the application of the Drug Equivalency Tables involved only the variance context. Thus, in a case involving Ecstasy, United States v. Long, Criminal No. 14-00178, the defense asked this judge to vary from the guideline range in light of what the defense argued was the Sentencing Commission's unwarranted treatment of MDMA, or Ecstasy. The defense noted that the Sentencing Guidelines treated 1 gram of MDMA as equivalent to more than twice as much marihuana as 1 gram of cocaine. In that case, there was no dispute relating to the calculation of the guideline range. This judge imposed a sentence of 15 months in custody, a considerable variance from the guideline range of 57 to 71 months, but in so doing this judge found it unnecessary to address the treatment of MDMA by the guidelines, relying on other factors to reduce the sentence while neither accepting nor rejecting the defense argument on that subject. In a different case in this district, United States v. Dafang, Criminal No. 14-00722, Judge J. Michael Seabright accepted the argument by the defense that the treatment of MDMA by the Sentencing Commission was unreasonable and on that ground varied downward from the guideline range. Because both Long and Dafang involved MDMA , a substance expressly addressed by the Sentencing Guidelines, neither of those cases required the kind of guideline analysis required in the present case.

controlled substance, and possessing methamphetamine. The present order resolves a dispute between Holmes and the Government over the Base Offense Level applicable under the Sentencing Guidelines to the charge of possessing ethylone with intent to distribute it.

The Indictment filed in Criminal No. 15-00245 describes ethylone as going by the street names “bath salts” and “molly” and as being “a positional isomer of butylone, a Schedule 1 controlled substance.” There is no dispute that ethylone, as an isomer of butylone, is indeed a Schedule 1 controlled substance. See 21 C.F.R. § 1308 (temporary placement by DEA of 10 synthetic cathinones, including butylone, into Schedule 1, effective March 7, 2014).

As part of its consideration of factors affecting what sentence to impose, this court must calculate the applicable guideline range provided for by the United States Sentencing Guidelines. See 18 U.S.C. § 3553(a)(4)(A). Under the Sentencing Guidelines, the Base Offense Level applicable to a drug charge turns on the type and amount of drug involved, as set forth in § 2D1.1 of the Sentencing Guidelines. While § 2D1.1 assigns Base Offense Levels to a number of controlled substances, neither butylone nor ethylone is mentioned in § 2D1.1.

Application Note 6 to § 2D1.1 sets forth a procedure for determining the Base Offense Level “[i]n the case of a

controlled substance that is not specifically referenced in this guideline." The court is directed to "determine the base offense level using the marihuana equivalency of the most closely related controlled substance referenced in this guideline." Drug Equivalency Tables are included in Application Note 8(D) to § 2D1.1. Those tables list a variety of drugs, providing with respect to each listed drug a corresponding amount of marihuana. For example, 1 gram of heroin is listed as equivalent to 1 kilogram of marijuana, and 1 gram of cocaine is listed as equivalent to 200 grams of marihuana.

Application Note 6 outlines three factors that "the court shall, to the extent practicable, consider" in determining "the most closely related controlled substance":

> (A) Whether the controlled substance not referenced in this guideline has a chemical structure that is substantially similar to a controlled substance referenced in this guideline.
>
> (B) Whether the controlled substance not referenced in this guideline has a stimulant, depressant, or hallucinogenic effect on the central nervous system that is substantially similar to the stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance referenced in this guideline.
>
> (C) Whether a lesser or greater quantity of the controlled substance not referenced in this guideline is needed to produce a substantially similar effect on the central nervous system as a controlled substance referenced in this guideline.

The Government has taken the position that this court should rely on testimony by the Government's two expert witnesses

to conclude that, considering the three factors listed in Application Note 6, the controlled substance listed in the Drug Equivalency Tables that is most closely related to ethylone is 3,4-methylenedioxy-N-ethylamphetamine ("MDEA"), 1 gram of which is listed as equivalent to 500 grams of marijuana (the same ratio provided for MDMA). If the court accepts the Government's position, the guideline range will be 57 to 71 months.

Relying on two defense expert witnesses, Holmes counters that the listed substance most closely related to ethylone is methcathinone, which has a 1:380 equivalency.[2] If this court adopts Holmes's position, the Base Offense Level will be 2 levels below that urged by the Government, resulting in a guideline range of 46-71 months.

The Probation Office preliminarily accepted the Government's position and prepared a Presentence Investigation Report that treated MDEA as the listed drug most closely related to ethylone for purposes of calculating the guideline range. However, at that time, the Probation Office did not have Holmes's challenge to that position. Holmes had originally indicated that, while MDEA was correctly used for guideline calculation

[2] As the Government has indicated it recognizes, Holmes is not, in identifying methcathinone as the most closely related drug listed in the Drug Equivalency Tables, conceding that the 1:380 ratio is appropriate for ethylone. To the contrary, Holmes has already indicated that, in connection with a variance request, he plans to argue that the 1:380 ratio is unwarranted for methcathinone, and even more unwarranted for ethylone.

purposes, he planned to seek a variance by arguing that the Sentencing Commission's 1:500 ratio for MDEA was not empirically sound. Holmes subsequently amended his position and challenged the guideline calculation. The Probation Office is now awaiting this court's ruling to see whether it should redo its guideline calculations.

This court heard from competing witnesses about the chemical structure of ethylone. The Government called Dr. Daniel Willenbring, who has a Ph.D. in organic chemistry and is a drug science specialist with the Drug Enforcement Administration based in Virginia. Holmes called Dr. Mark Hagadone, who has a Ph.D. in organic chemistry and who runs a chemistry consultant's business in Honolulu, Hawaii.

Different witnesses testified about the effects of using ethylone. The Government called Dr. Cassandra Prioleau, who has a Ph.D. in pharmacology and is a drug science specialist with the DEA in Virginia. Dr. Prioleau declined to opine about the potency of ethylone. Holmes called Dr. John Halpern, M.D., who is an assistant professor of psychiatry at Harvard Medical School and is the psychiatrist-in-charge of Coverage, Alcohol and Drug Abuse Treatment Programs at McLean Hospital in Belmont, Massachusetts. Dr. Halpern testified about the effects as well as the potency of ethylone.

The three out-of-state expert witnesses (Dr. Willenbring, Dr. Prioleau, and Dr. Halpern) have experience testifying about the Drug Equivalency Tables. See, e.g., United States v. Brey, 627 Fed. App'x 775 (11th Cir. 2015) (referring to testimony by Drs. Willenbring and Prioleau that listed drug most closely related to ethylone is MDEA); United States v. Marte, 586 Fed. App'x 574 (11th Cir. 2014) (noting testimony by Dr. Prioleau in district court that methylone was most closely related to MDMA); United States v. Ketchen, 2015 WL 3649486 (D. Me. June 11, 2015)(referring to grand jury testimony by Dr. Prioleau comparing effects of using methcathinone to effects of using MDPV); United States v. McCarthy, 2011 WL 1991146 (S.D.N.Y. May 19, 2011) (summarizing testimony by Dr. Halpern in support of variance from guideline range based on alleged flaws in Sentencing Commission's setting of 1:500 MDMA-to-marihuana ratio). See also ECF No. 67-2 (Government's submission of transcript of testimony about MDMA by Dr. Halpern in United States v. Thammavongsa, Case No. 2:13-cr-255-JAD-GWF (D. Nev. Dec. 3, 2014)).

In the present case, all four expert witnesses were extensively cross-examined after their detailed direct examinations. Holmes's vigorous opposition to the Government's expert witnesses' testimony distinguishes this case from United States v. Brey, which involved consideration of the three factors in Application Note 6 with respect to ethylone, the very drug in

issue here. The Eleventh Circuit in Brey affirmed the district court's conclusion that MDEA, with its 1:500 ratio, was the listed drug most closely related to ethylone. As the Eleventh Circuit noted, the district court was not presented with contrary evidence: "The government produced reliable and specific evidence of the first two factors, chemical structure and effect on the user, which Brey does not challenge." 627 Fed. App'x at 780.

A Westlaw search has yielded a relatively small number of other federal cases involving ethylone. Some of the orders in those cases disposed of motions to suppress and did not address Application Note 6. The court did find a reference in Westlaw to a party's brief in United States v. Chauca, Case No. 8:14-CR-409-T-36TBM, which caused this court to look at the electronic case file in that case. From what the court can tell, Chauca and United States v. Palfalvi, Case No. 2:14-CR-79-FIM-38DNF, are ethylone cases filed in the Middle District of Florida. It appears that, in both cases, the Government offered Dr. Willenbring and Dr. Prioleau, and the defense offered Dr. Gregory Dudley, a professor of chemistry at Florida State University. In those cases, the defense expert, unlike the witnesses offered in the present case by Holmes, appears to have agreed with Government witnesses that the listed substance most closely related to ethylone was MDEA. The defense relied on Dr. Dudley

not for purposes of calculating any guideline range but rather in arguing for variances from the guideline ranges based on application of a marijuana ratio for ethylone lower than the guideline ratio for MDEA. As this court noted earlier, while the court understands that it will be asked to vary from whatever guideline range is calculated, the present order is restricted to determining which listed drug is most closely related to ethylone for guideline calculation purposes.

Unlike the defendants in Brey and in the Florida cases referred to above, Holmes has directly challenged the Government's evidence relating to the guideline calculation for ethylone. Defense counsel not only cross-examined Dr. Willenbring and Dr. Prioleau, counsel also offered testimony by Dr. Hagadone and Dr. Halpern. Notably, in Brey, the Government provided no evidence as to the potency of ethylone, stating in that case, as it stated here, that it lacked reliable data as to potency. While the defendant in Brey attacked the Government's position in light of the absence of potency evidence, he himself did not attempt to fill that void. 627 Fed. App'X at 780-81. Holmes, by contrast, presented Dr. Halpern's opinion concerning potency.

The record before this court causes this court to reach a different conclusion from that reached in Brey.

II. CONSIDERATION OF THE THREE FACTORS IN APPLICATION NOTE 6.

A. Chemical Structure.

Subsection (A) of Application Note 6 directs the court to consider whether ethylone has "a chemical structure that is substantially similar to a controlled substance" referenced in § 2D1.1. This court heard testimony comparing the chemical structure of ethylone to the chemical structures of MDEA and of methcathinone. (Along the way, this court also heard testimony about the chemical structures of a wide variety of other substances.)

Both Dr. Willenbring, testifying for the Government, and Dr. Hagadone, testifying for Holmes, said that, in reaching their different conclusions about which listed controlled substance's chemical structure was substantially similar to the chemical structure of ethylone, they focused on the "core structure" of ethylone. Both witnesses relied on the definition of "core structure" in 21 C.F.R. § 1300.01 ("Definitions relating to controlled substances").

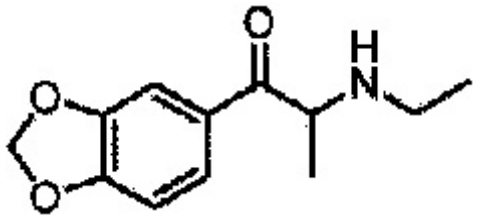
The definition of "core structure" is included in the definition of "isomer," which is relevant here because ethylone is a positional isomer of butylone:

> [T]he term "positional isomer" means any substance possessing the same molecular formula and core structure and having the same functional group(s) and/or substituent(s) as those found in the respective Schedule I hallucinogen, attached at any position(s) on

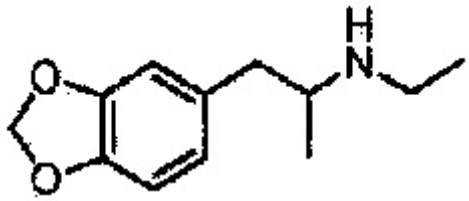
> the core structure, but in such manner that no new chemical functionalities are created and no existing chemical functionalities are destroyed relative to the respective Schedule I hallucinogen. Rearrangements of alkyl moieties within or between functional group(s) or substituent(s), or divisions or combinations of alkyl moieties, that do not create new chemical functionalities or destroy existing chemical functionalities, are allowed i.e., result in compounds which are positional isomers. For purposes of this definition, the "core structure" is the parent molecule that is the common basis for the class; for example, tryptamine, phenethylamine, or ergoline. Examples of rearrangements resulting in creation and/or destruction of chemical functionalities (and therefore resulting in compounds which are not positional isomers) include, but are not limited to: Ethoxy to *alpha*-hydroxyethyl, hydroxy and methyl to methoxy, or the repositioning of a phenolic or alcoholic hydroxy group to create a hydroxyamine. Examples of rearrangements resulting in compounds which would be positional isomers include: *Tert*-butyl to *sec*-butyl, methoxy and ethyl to isopropoxy, N,N-diethyl to N-methyl-N-propyl, or *alpha*-methylamino to N-methylamino.

21 C.F.R. § 1300.01.

There is no dispute as to what the chemical structures of ethylone, MDEA, and methcathinone are. The court includes diagrams of the chemical structures of those substances here, using "bond-line notations," which represent molecules using a simplified convention in chemistry that deletes letter references to carbon atoms and to hydrogen atoms that are attached to carbon atoms. The angles where two lines meet represent places where carbon atoms attach.



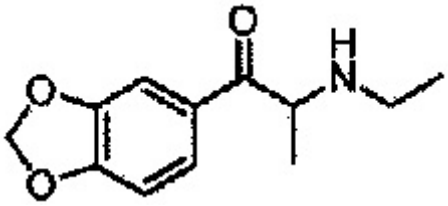
ethylone



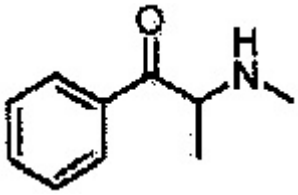
MDEA

When drawn in two dimensions, ethylone and MDEA have chemical structures that are visibly substantially similar. As depicted in the drawings above, the only difference between the chemical structures of ethylone and MDEA is the inclusion in ethylone of a double-bonded single oxygen atom at what is called the *beta* position. That oxygen represents a ketone, and the testimony before the court often used the term "*beta* keto" in referring to that part of ethylone.

Depicted in two dimensions, ethylone and methcathinone appear less similar to each other than ethylone and MDEA:



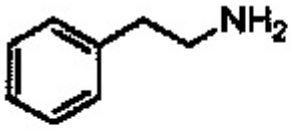
ethylone



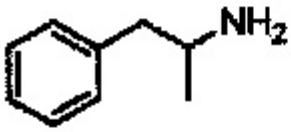
methcathinone

Dr. Willenbring said that ethylone and MDEA both have phenethylamine as their core chemical structure. He described ethylone and MDEA as both having the same substitutions to the phenethylamine core: "Ethylone and MDEA share the same core chemical structure and are both substituted with the same substituents at the *a*-position, nitrogen (N) atom, and 3,4-positions." See Government Exhibit 3 at 2.

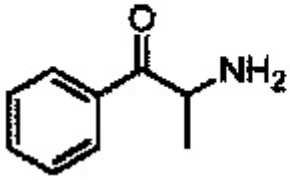
Dr. Willenbring looked at three chemical groups relevant to the matter before the court: phenethylamine, amphetamine, and cathinone. The following diagrams apply to those groups:



phenethylamine



amphetamine



cathinone

See Government Exhibit 4 at 1.

As Dr. Willenbring explained, the diagrams above indicate that all amphetamines are phenethylamines, but not all

phenethylamines are amphetamines, and that all cathinones are both phenethylamines and amphetamines, but not vice versa. See Government Exhibit 4 at 3. Ethylone, MDEA, and methcathinone are all phenethylamines as well as amphetamines. Ethylone and methcathinone are also cathinones. Id.

Dr. Willenbring noted that the definition of "core structure" at 21 C.F.R. § 1300.01 identified phenethylamine as an example of a parent molecule that is the common basis for a class. He concluded that the core structure for both ethylone and MDEA was phenethylamine.

Dr. Hagadone, however, testified that the two-dimensional diagrams did not capture the totality of what this court needed to consider about chemical structures. He noted that the molecule existed in three dimensions, and that the additional dimension spoke to how the molecule operated and how the human body reacted to it. In his opinion, analysis of chemical structure involves not just the geometry of a molecule but also consideration of the nature of the atoms and the oxidation status of the atoms.

Critical to Dr. Hagadone's analysis was the "cathinone moiety" within ethylone that caused him to place ethylone in the cathinone family. He testified that a "moiety" was a significant section of a molecule. He opined, "The cathinone moiety is responsible for the 'family' member's physiological and

psychological properties including the drug's 'abuse potential.'" See Holmes Exhibit A at 5. He likened ethylone to methcathinone, "with its close structural similarities (cathinone moiety)," noting, among other things, that this allowed ethylone to be eliminated from the body more readily than MDEA. Id. at 5,7. Challenging the Government's treatment of ethylone's *beta*-ketone as a minor difference in chemical structure from MDEA, Dr. Hagadone said in his written opinion, "Our argument is that it is NOT just a single oxygen substitution but it is *THE CHEMICAL OXIDATION* of a carbon atom resulting in the addition of an oxygen atom." Id. at 5. He concluded that ethylone was substantially similar "to the cathinone family of analogues" and not to the phenethylamine family "due to the presence of its uniquely oxidized carbon *moiety*." Id.

The Government complained that, although purporting to testify about chemical structures (the first factor listed in Application Note 6), Dr. Hagadone was including in his opinion issues going to ethylone's effect and potency (the second and third factors listed in Application Note 6). The Government has a point. Matters such as the ease of eliminating a substance from the body do indeed concern the effect and potency of a drug. However, it is not clear that chemistry easily lends itself to analysis in the three separate categories listed in Application Note 6. Whether or not the Sentencing Commission, in creating

those distinct categories, had significant input from scientists, discussion of the effect of a chemical structure on something like ease of elimination from the body may, at least to some degree, be inseparable from discussion of the chemical structure itself. Dr. Hagadone's failure to stay within what may be the artificial delineations in Application Note 6 may not necessarily reduce the force of his opinion as to chemical structure.

Having said that, however, this court is conscious that Dr. Willenbring expressed no difficulty in focusing solely on the first factor in Application Note 6, presenting an opinion largely devoid of reference to ethylone's effect or potency. His approach, which might seem to be that of a "purist," was echoed by the Government's other expert witness, Dr. Prioleau. Dr. Prioleau testified that effect and potency were more matters of pharmacology, which examines how drugs affect humans, than chemistry. Possibly, Dr. Willenbring's separation of his chemical structure analysis from the issues of effect and potency was aided by his experience in dealing with the factors as they are listed in Application Note 6. As noted earlier in this order, Dr. Willenbring has testified in other proceedings of this nature. Dr. Hagadone was not among the three out-of-state witnesses that this court noted earlier in this order have been called upon to opine on the Drug Equivalency Tables in § 2D1.1.

Thus, Dr. Hagadone, while an experienced expert witness, may have less background in applying the categories in Application Note 6.

The record is not sufficient to allow this court to determine that one expert's method of analyzing chemical structure is superior to the other's. That is, this court cannot tell whether the chemical structure factor in Application Note 6 should be treated as fitting into a separate box, or whether there is considerable spillover into the effects and potency boxes. It may well be that one method is preferable, or that only the degree of spillover is debatable. If the experts had addressed not only each other's opinions but also the issue of whether, why, and to what degree effect and potency may or may not be considered in analyzing chemical structure, that might have allowed this court to credit one expert's approach over the other's. That did not occur here. With neither party asserting a Daubert challenge to any expert opinion, this court fully considers both Dr. Willenbring's and Dr. Hagadone's opinions.

Because Dr. Willenbring and Dr. Hagadone disagreed as to which "core structure" to assign to ethylone, they identified different listed substances as substantially similar to ethylone.

What this court draws from the testimony it received concerning ethylone's chemical structure is that both Dr. Willenbring and Dr. Hagadone provided persuasive analyses. Fortunately, at least for purposes of the task now before this

court, the court need not determine whether ethylone's chemical structure is more similar to MDEA than to methcathinone, or vice versa. Application Note 6 directs the court to examine whether ethylone "has a chemical structure that is substantially similar to a controlled substance referenced" in § 2D1.1. The language of Application Note 6 suggests to this court that it need not determine whether ethylone is more similar to MDEA than to methcathinone or more similar to methcathinone than to MDEA. Rather, this court need only determine whether a listed substance has a chemical structure that is substantially similar to ethylone. This court concludes that ethylone has a chemical structure that is substantially similar to **both** MDEA and methcathinone. Nothing in Application Note 6 restricts this court to recognizing only a single substantially similar chemical structure.

Thus, as to the chemical structure factor, there is a draw between MDEA, submitted by the government, and methcathinone, submitted by Holmes.

B. Stimulant, Depressant, or Hallucinogenic Effect.

The second factor in Application Note 6 involves consideration of whether ethylone has a stimulant, depressant, or hallucinogenic effect that is substantially similar to the effect of a listed substance. Dr. Prioleau testified for the Government, and Dr. Halpern testified for Holmes on this matter.

Both witnesses concluded that ethylone has a stimulant effect and provided the technical background for this conclusion. They examined ethylone's inhibiting of dopamine transporter, serotonin transporter, and norepinephrine transporter. Both referred to studies and other materials they had reviewed.

Dr. Prioleau concluded that ethylone's stimulant effect is substantially similar to MDEA's stimulant effect. Dr. Halpern did not disagree, but added several other listed drugs with substantially similar effect. Thus, he opined that ethylone is "a cathinone with stimulant and MDMA-like properties," that ethylone "shares stimulant and empathogenic effects to MDMA," and that the effects of ethylone, MDMA, MDEA, methylone, methcathinone, as well as other drugs are similar. See Holmes Exhibit C at 1, 4-5.

Once again, this court sees no need to invent a dispute when there is none. Application Note 6 does not preclude the existence of more than one listed substance with an effect substantially similar to that of ethylone. Putting aside the likelihood that there are numerous other listed substances that qualify as substantially similar in effect to ethylone, this court concludes that **both** MDEA and methcathinone have effects on the nervous system substantially similar to ethylone.

C. Potency.

Application Note 6 requires a third consideration: whether a lesser or greater quantity of ethylone is needed to produce a substantially similar effect on the central nervous system as a listed substance.

The Government provided no evidence going to this third factor. Dr. Prioleau said she had reviewed the available scholarship but considered it insufficient to support any opinion as to ethylone's potency.

Dr. Halpern did not share that view and opined that ethylone was considerably less potent than numerous listed substances, including both MDEA and methcathinone. He criticized several marijuana ratios in the Drug Equivalency Tables as incompatible with today's scientific data. He pointed, for example, to cocaine, which has a 1:200 ratio, and questioned why drugs like MDMA and MDEA had 1:500 ratios when they were less harmful than cocaine. He not only described a study he had conducted involving MDMA users, he also noted that cocaine use results in more medical emergencies, more deaths, more violence, and more abuse than MDMA or MDEA use.

Dr. Halpern referred to a study with laboratory animals that were trained to toggle a bar when experiencing the effects of MDMA. When MDMA was replaced with methylone and butylone, the animals toggled the bar about half as frequently, which Dr.

Halpern testified supported the conclusion that methylone and butylone (neither of which is listed in the Drug Equivalency Tables) are about half as potent as MDMA. This testimony is consistent with testimony that Dr. Prioleau gave in a case involving methylone. See United States v. Marte, 586 Fed. App'x 574, 575 (11th Cir. 2014)("Undisputed testimony from Dr. Cassandra Prioleau, a pharmacologist for the Drug Enforcement Agency, established that the Agency used a widely accepted methodology to determine that methylone is 'most related' to MDMA; methylone, like MDMA, acts as a stimulant on the central nervous system; and methylone is half as potent as MDMA."). See also United States v. Chong, 2014 WL 4773978 (E.D.N.Y. Sept. 22 2104)(applying 1:200 ratio in methylone case).

Calling ethylone "a weaker analog of methylone" and referring to research by Simmler published in the British Journal of Pharmacology, Dr. Halpern testified that ethylone was less potent than methylone. Asked to compare the potency of MDEA, methcathinone, and khat (all of which are listed in the Drug Equivalency Tables) with the potency of ethylone, Dr. Halpern selected methcathinone as satisfying the third factor in Application Note 6.

Notwithstanding Dr. Prioleau's hesitation in opining on the potency of ethylone, this court is persuaded by Dr. Halpern's testimony that MDMA and MDEA are both more potent than

methcathinone, and that methcathinone is more potent than ethylone. Dr. Prioleau might have been more comfortable if she had had at least as much research to rely on as she had when she opined on the potency of methylone. Unfortunately, ethylone appears to have been studied less. But Application Note 6 does not require perfection. It asks the court to consider matters "to the extent practicable." Dr. Halpern had credible data on which to base his opinion that it made more sense to equate ethylone's potency to methcathinone's potency than to MDEA's potency. Confining itself to listed substances (and therefore disregarding methylone at this point), this court concludes that the amount of ethylone and the amount of methcathinone needed to produce substantially similar effects diverge less than the amount of ethylone and the amount of MDEA needed to produce substantially similar effects.

III. CONCLUSION.

This court concludes that the listed substance most closely related to ethylone is methcathinone. The court rejects the Government's argument that MDEA is the listed substance most closely related to ethylone.

While ethylone has a chemical structure that is substantially similar not only to methcathinone but also to MDEA, and while ethylone, methcathinone, and MDEA have substantially similar effects on the central nervous system, it is potency, the

third factor listed in Application Note 6, that is determminative. Ethylone's potency is more similar to methcathinone's potency than to MDEA's. This court therefore accepts Holmes's argument that methcanone, with its 1:380 ratio, is the listed substance most closely related to ethylone, rather than MDEA, with its 1:500 ratio, as the Government submits.

Further sentencing proceedings, including Holmes's variance request, have already been scheduled.

APPROVED AND SO ORDERED.

DATED at Honolulu, Hawaii; April 22, 2016.

/s/ Susan Oki Mollway
Susan Oki Mollway
United States District Judge

United States v. Austin-Ernest Kaholo Holmes
CR. NO. 15-00245-01 SOM, CR. NO. 15-00410-01 SOM
ORDER DETERMINING THAT, FOR PURPOSES OF CALCULATING THE SENTENCING GUIDELINE RANGE, METHCATHINONE IS THE LISTED DRUG MOST CLOSELY RELATED TO ETHYLONE

DECLARATION OF CHARLES S. GROB, M.D.

I, Charles S. Grob, M.D., declare as follows:

1) I am a physician licensed to practice in the State of California since 1980. I make this declaration based upon my personal knowledge of the following facts and if called as a witness I could and would testify to the facts set forth herein.
2) I am a physician specializing in psychiatry as well as child and adolescent psychiatry. I am certified by the American Board of Psychiatry and Neurology in both General Psychiatry and Child and Adolescent Psychiatry. In 1975 I received my B.S. degree from Columbia University. In 1979 I received my M.D. degree from the State University of New York, Downstate Medical Center, in Brooklyn, N.Y. I completed my medical internship in 1980 at Pacific Medical Center in San Francisco, CA. I completed my general psychiatry residency in 1982 at Cedars-Sinai Medical Center in Los Angeles, CA. I completed my child and adolescent psychiatry fellowship in 1984 at The Johns Hopkins Hospital in Baltimore, MD. I was on the full-time faculty in the Departments of Psychiatry and Pediatrics at The Johns Hopkins Hospital from 1984 – 1987 and the Department of Psychiatry at the University of California, Irvine, from 1987 – 1993.
3) From 1993 to the present I have been on the full-time faculty of Harbor-UCLA Medical Center in Torrance, CA. During this time I have been the Director of the Division of Child and Adolescent Psychiatry. I am currently a Professor of Psychiatry and Pediatrics at the UCLA School of Medicine.
4) Over the last twenty-five years I have developed as an area of research expertise the study of hallucinogens and their relation to the fields of medicine and psychiatry. I have published numerous review and original research articles in the professional literature on this topic. In the 1990s I conducted the first FDA approved research investigation with the drug 3,4-methlenedioxymethamphetamine (MDMA), a Phase 1 study of the range of physiological and psychological effects in adult normal volunteer subjects. I am currently conducting an FDA approved investigation of the use of an MDMA treatment model in adults diagnosed on the autism spectrum who have comorbid social anxiety.
5) I have also conducted human research on the range of effects of the Amazonian plant hallucinogen decoction, ayahuasca, as well as a clinical treatment study of psilocybin (the active alkaloid in hallucinogenic mushrooms) in patients with advanced-stage cancer and severe existenial anxiety. Our findings for this study were published in the *Archives of General Psychiatry* in 2011.
6) I have been asked to comment on the drugs methylone and MDMA, in relation to criminal court sentencing guidelines.

7) Methylone is 3,4-methylenedioxymethcathinone, a synthetic cathinone derivative of the khat plant (*Catha edulis)*. Khat has a natural habitat that covers much of the Horn of Africa and the Arabian Peninsula. Chewing the leaves of the khat plant for its psychostimulant effects has been documented within its area of cultivation for several hundred years, and in all likelihood dates to antiquity. It is considered to be relatively well-tolerated and is culturally accepted. There are believed to be currently ten million daily khat users worldwide, though predominantly in east Africa and the Arabian Peninsula.

8) Over the last several years interest has developed in methylone, along with mephedrone (4-methylmethcathinone) and MDPV (3,4-methylenedioxypyrovalerone), which have been collectively referred to informally by users and by the media as "bath salts". Their use in the United States did not emerge until 2010, although they were known a few years earlier in western Europe. By late 2011 they were officially classified in the U.S. as Schedule 1 drugs, reflecting media sensationalizing coverage of what was considered to be a new and emerging drug trend. Unfortunately, Schedule 1 status severely restricts human subject research and complicates objective assessment of the range of effects of these compounds. Schedule 1 classification also impedes controlled investigation of potential therapeutic applications, seriously limiting the development of new and potentially valuable medicinal agents. Consequently, little clinical research has been conducted and our knowledge of the range of effects of these drugs remains limited.

9) While mephedrone was first synthesized in 1929 and MDPV in 1967, methylone was not synthesized until the 1990s, by chemists Alexander Shulgin and Peyton Jacob, who in 1996 patented the compound as an antidepressant and anti-Parkinsonian agent. No formal investigations were conducted, however, owing first to lack of funding and subsequently to the emergence of the recreational "bath salt" phenomenon in the U.S. Of note, however, is the chemical structural similarity of the approved medication bupropion (sold under the brand names *Wellbutrin* as an antidepressant and as treatment for ADHD, and *Zyban* as a smoking cessation drug) to methylone. While not considered to be an abused drug, bupropion will substitute for cocaine and amphetamine in pre-clinical laboratory studies conducted in animal models.

10) While most individuals who ingest synthetic cathinones tolerate them without evident deleterious effect, and anecdotal accounts reflect the experience of some users who believe that this class of drugs may have therapeutic effects, there have been a small number of adverse outcomes reported in the literature. Most of these deleterious effects, however, appear to occur in individuals who had taken mephedrone or MDPV, but not methylone. In many of these cases there were also a variety of mitigating factors that increased the likelihood of problematic

outcome, including polydrug use (taking additional drugs and alcohol along with the synthetic cathinones), excessive dosages and pre-existing medical and/or psychiatric conditions. Furthermore, the role of the media in creating false impressions cannot be discounted, an example being the May, 2012 homicide in Miami, Florida, known as the "Miami cannibal attack", and widely attributed in the press to "bath salt" ingestion. Subsequent investigation, however, identified that the only drug to test positive on toxicology in the severely mentally disturbed assailant was marijuana. While no synthetic cathinone was apparently involved in this tragic case, there remains the lingering public perception that "bath salts" were the cause. The impact, consequently, of such media sensationalizing and distortion on public perception and on sentencing guidelines are unfortunately not insignificant.

11) In both the United States and Europe the predominant compounds identified in analyzed samples of "bath salts" turn out to be mephedrone and MDPV. In the U.S, as per recent data provided by the DEA Office of Diversion Control, only about ¼ of such analyses have identified methylone. There are differences between the different "bath salts" and when compared to other psychostimulants. Pre-clinical laboratory studies have established that MDPV has far greater similarities to cocaine's effects on the momoamine dopamine than does methylone. Furthermore, mephedrone induced much higher levels of drug self-administration than did methylone. And unlike cocaine or methamphetamine, methylone did not lead to escalating drug intake or increased reinforcer efficacy. Indeed, methylone, on the basis of such laboratory drug discrimination studies, is considered to have relatively lower potential for abuse and compulsive use than the prototypical psychostimulants, cocaine and methamphetamine. Of related significance is that the prescription medication, buproprion, in animal models trained to discriminate between different drugs, will substitute for cocaine and methamphetamine, while methylone will not substitute for cocaine and methamphetamine.

12) Methylone is considered to have comparatively low toxicity to central monamine systems when taken alone. As such, some investigators have considered it to be a potentially useful alternative clinically for the treatment of refractory, or treatment resistant, depression or attention deficit hyperactivity disorder (ADHD). While associated with a range of adverse effects, most reported cases were of individuals who had engaged in polysubstance abuse. Modest dosages of methylone taken alone, in the absence of other drugs, does not appear to be particularly hazardous to health. While a handful of deaths have been reported, according to data provided by the DEA, as of 2013 only three fatalities had been associated with methylone, and these were likely in the context of polysubstance abuse and excessive dosages.

13) Most individuals who have taken methylone, at modest dosages, report a mild, easily controlled altered state of consciousness. Indeed, a

methylone high is characterized by its mild effects on sensorium, increased empathy towards self and others and perceived potential (albeit as yet formally unexplored) for therapeutic application in appropriate settings.

14) Compared to the prototype psychostimulant, cocaine, methylone (when taken at appropriate dose and in the absence of polysubstance use), on the basis of available clinical data, is much milder, less likely to be habit forming or addictive, far less likely to be associated with violent behavior and implicated in far fewer fatalities. Apart from alcohol, cocaine is associated with more Emergency Department visits in the United States than any other drug of abuse. In 2009, approximately 425,000 ER visits in the U.S. were associated with cocaine use and in 2011, over 500,000 Emergency Department visits were reported to be related to cocaine use. Government data bases of ER visits for methylone, however, are very limited, owing to its relatively recent emergence as a drug of interest and the temporal lag in reporting accumulated data. The most recent data for Emergency Department visits and associated drug use, from 2011, does not include mention of methylone or the other so-called "bath salts". While there have undoubtedly been such cases over the past few years, it is likely that cases of moderate dose methylone, used in the absence of other drugs, comprise only a miniscule percentage of the overall number of drug related emergencies.

15) As Director of a Division of Child and Adolescent Psychiatry at a very large public sector academic medical center for the past twenty-one years, where I am responsible for the clinical oversight of over 1,000 patients annually in outpatient and psychiatric emergency room settings, I have been informed of only a very small number of patients who had presented with methylone or other synthetic cathinone abuse. This contrasts significantly with frequent reports of cocaine and methamphetamine use that have commonly been identified among adolescents and adults undergoing evaluation in our clinical settings.

16) Regarding the drug MDMA (3,4-methylenedioxymethamphetamine), far more information is available than with methylone, given its relatively long presence as both a recreational drug and as a potential therapeutic agent that has in fact been examined in human research studies. In regards to the purpose of this declaration, to contrast the range of effects of MDMA with that of cocaine, for purposes of sentencing guidelines, the ruling of Judge W.H. Pauley in the McCarthy versus United States decision, in 2011, is quite relevant. In his ruling, Judge Pauley accurately determined that MDMA causes significantly less risk of injury to users than cocaine, and consequently that its illicit use should be subject to a lesser degree of punishment as per sentencing guidelines, compared to cocaine.

17) In Judge Pauley's ruling he provides Emergency Department data from 2007 for cocaine, which constituted over one-half million total ER visits

(almost 30% of all drug or alcohol related visits), and MDMA, which comprised less than 13,000 visits and 0.7% of total ER drug and alcohol related episodes.

18) In regards to relative risks to health and safety, cocaine is a far more dangerous drug than MDMA. Cocaine has long been identified as a drug with high addiction potential, whereas MDMA does not cause physiological addiction, though it is capable of creating states of psychological dependence in a minority of users. Cocaine is also far more likely to precipitate episodes of violence and agitation than MDMA, which is associated with facilitating empathic and expansive states of consciousness, and has in some circles acquired the informal name of the "love drug". While MDMA is certainly not without risk, and has been identified in fatal outcomes, it is well established that effective safety parameters do exist when proper attention is given to set and setting. Most adverse outcomes with MDMA occur in the context of excessive dosing, concomitant polysubstance abuse, underlying medical and psychiatric vulnerabilities and high risk settings (eg. so-called "rave" events, which are often associated with prolonged exercise [dancing], poor ventilation, high ambient temperatures and lack of fluid replacement, which can lead to very dangerous, albeit rare, cases of malignant hyperthermia). Most users of MDMA consume the drug on limited occasions. Daily use of MDMA, unlike cocaine, is extremely rare. Most individuals who self-administer MDMA do so only on an occasional basis, and over time appear to self-limit their use. A major problem with MDMA use, and likely responsible for a significant percentage of adverse outcomes, is the high risk of drug substitution. Marketed as "ecstasy", surveys have identified that upwards to half of these drugs contain psychoactive substances other than MDMA. In fact, a number of deaths attributed to "ecstasy" appear to have been caused not by MDMA, which was not present on toxicological analyses, but rather PMA (paramethoxyamphetamine), considered to be one of the most potent and dangerous amphetamines known to man. Nevertheless, because of widespread misinformation and confusion, often propagated by sensationalized media coverage, these adverse "ecstasy" outcomes have often been mistakenly attributed to MDMA.

19) From the late 1980s to the early 2000s, substantial media coverage as well as expenditure of considerable federal research funding focused on the supposed risk of MDMA induced neurotoxicity. Judge Pauley, in his 2011 opinion, accurately identifies that such concerns have often been exaggerated. While excessive use of what is often a poor quality product, taken with other drugs and alcohol and under adverse conditions by individuals with significant underlying vulnerability, may clearly lead to impaired neuropsychological and psychiatric status, it is equally apparent that modest dosages taken on only an occasional or single time basis, in the absence of other drugs or alcohol, and under optimal conditions by individuals with relatively good psychiatric and

medical health, do not appear to be associated with any clinically significant decrement of function. I have documented the serious methodological flaws along with misleading data interpretations present in some of the high profile MDMA neurotoxicity literature in several reviews I have published in psychiatric, neuroscience and drug abuse journals and textbooks over the last fifteen years. In recent years, however, there appears to be growing recognition that the fears of MDMA induced brain damage have been grossly overstated and consequently there has evolved considerably reduced media coverage of this issue.

20) Indeed, much of the preclinical laboratory evidence of neurotoxicity has been from small animal studies (usually with rats) where very high dosages of MDMA were injected into the animal, sometimes twice daily over multiple successive days, whereas recreational human users take MDMA orally and never inject the drug, virtually never take MDMA on successive days and almost always self-administer MDMA at least a week or often much longer apart and proportionally use far smaller dosages than the animals are injected with.

21) While recreational use has lessened over the past decade, interest has grown in MDMA's potential as an adjunct to psychiatric treatment, particularly in disorders that have proved to be refractory, or non-responsive, to conventional treatment. Formally approved studies have recently been conducted on patients with chronic, treatment-resistant post-traumatic stress disorder (PTSD). Published results indicate that while very good safety parameters were maintained during treatment, with no evident injury to subjects, treatment outcome was frequently excellent, with complete resolution of disabling symptoms in many of the individuals treated. Before its emergence as a popular recreational drug in the late 1980s and early 1990s, MDMA was considered to be a highly promising compound, when implemented in an optimally constructed treatment model, with potential application to a variety of difficult to treat psychiatric conditions. Regrettably, with the surging recreational use of "ecstasy", formal and approved clinical research with MDMA had to be put on hold. At the present time, however, with the growing appreciation of the genuine risk to benefit ratio of MDMA, it is now possible for properly accredited investigators to receive federal, state and local sanction to conduct research into MDMA's potential as a safe and efficacious treatment. As indicated above, my research group at Harbor-UCLA Medical Center and the Los Angeles BioMedical Research Institute is currently conducting an FDA approved investigation of the use of an MDMA treatment model with adults on the autism spectrum who have social anxiety.

22) Over the last twenty-five years I have published in the professional literature a number of research and review articles on MDMA. Some, though not all, of my publications are referenced in this document as follows:

23) **Grob, C.S.,** Bravo, G. and Walsh, R.: Second Thoughts on 3,4 - Methylenedioxymethamphetamine (MDMA) Neurotoxicity, Archives of General Psychiatry, 47:288-289, 1990

24) Liester, M.B., **Grob, C.S.**, Bravo, G.L. and Walsh, R.N.: Phenomenology and Sequelae of 3,4- Methylenedioxymethamphetamine Use, Journal of Nervous and Mental Disease, 180:345-352, 1992.

25) **Grob, C.S.,** Bravo, G.L., Walsh, R.N. and Liester, M.B.: The MDMA-neurotoxicity controversy: Implications for clinical research with novel psychoactive drugs, Journal of Nervous and Mental Disease, 180:355-356, 1992.

26) **Grob, C.S**, Poland, R.E, Chang, L. and Ernst, T: Psychobiologic effects of 3,4-methylenedioxymethamphetamine (MDMA) in humans: methodological considerations and preliminary data, Behavioural Brain Research, 73:103-107, 1996.

27) **Grob, C.S.** and Poland, R.E: MDMA. In J.H. Lowinson, P. Ruiz, R.B. Millman and J.G. Langrod (Eds.), Substance Abuse: A Comprehensive Textbook, 3rd Edition, Baltimore: Williams and Wilkins, pp. 269-275, 1997.

28) **Grob, C.S.**: MDMA research: preliminary investigations with human subjects. International Journal of Drug Policy 9:119-124, 1998.

29) **Grob, C.S**.: Psychedelic drug research: recent developments with MDMA and ayahuasca, in R. Verres, H. Leuner and A. Dittrich (Eds.), Welten Des Bewusstseins, Berlin, Verlag fur Wissenschaft und Bildung, pp. 93-109. 1998.

30) Chang, L, Ernst, T.M, **Grob, C.S.** and Poland R.E: Proton magnetic resonance Spectroscopy in 3,4-methylenedioxymethamphetamine (MDMA or "ecstasy") users. Journal of Magnetic Resonance Imaging 10:521-526, 1999.

31) Chang, L., **Grob, C.S.,** Itti, L., Mishkin, F., Ernst, T., and Poland, R.E: Effect of ecstasy [3,4- Methylenedioxylenedioxy-methamphetamine (MDMA)] on cerebral blood flow: A co-registered SPECT and MRI study. Psychiatry Research: Neuroimaging Section 98:15-28, 2000.

32) **Grob, C.S**: Deconstructing ecstasy: The politics of MDMA research. Addiction Research 8:549-588, 2000.

33) **Grob, C.S.** Is U.S. drug policy on ecstasy scientifically justified? Journal of Addiction and Mental Health 5(2):17, 2002.

34) **Grob, C.S**. The politics of ecstasy. Journal of Psychoactive Drugs 34:143-144, 2002.

35) Cole, J, Sumnall, H. and **Grob, C.S.** Sorted: Ecstasy facts and fiction. The Psychologist 15:464-467, 2002.

36) Cole, J, Sumnall, H. and **Grob, C.S**. Where are the casualties? The Psychologist 15:474, 2002

37) Back-Madruga, C, Boone, K.B, Chang, L, **Grob, C.S**, Lee, A, Nations, H. and Poland,R.E.Neuropsychological effectsof3,4-methlyenedioxymetamphetamine (MDMA or ecstasy) in recreational users. Clinical Neuropsychology 17:446-459, 2003.

38) **Grob, C.S.** and Poland, R.E: MDMA: in J.H. Lowinson, P. Ruiz, R.B. Millman andJ.G.Langrod (Eds.), Substance Abuse: A Comprehensive

Textbook, 4th Edition,Phildadelphia: Williams and Wilkins, pp. 274-286, 2005.

39) **Grob, C.S.** The enigma of ecstasy: implications for youth and society. Adolescent Psychiatry 29:97-117, 2005.

40) Danforth, A.L. and **Grob, C.S.** Ecstasy: in G.L. Fisher and N.A. Roget (Eds.), Encyclopedia of Substance Abuse Prevention, Treatment and Recovery. London, U.K, Sage Publishers, pp. 352-354, 2009.

41) **Grob, C.S.** and Dobkin de Rios, M. Hallucinogens and related compounds: in R.Rosner (Ed.), Clinical Handbook of Adolescent Addiction. New York, Wiley-Blackwell, pp. 213- 223, 2013.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on June 21, 2014 at Irvine, California.

CHARLES S. GROB, M.D.

MATERIALS RE: SYNTHETIC MARIJUANA

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF FLORIDA
FT. PIERCE DIVISION

UNITED STATES,

Plaintiff,

v. Case No. 2:15-cr-14034

SAIFUL HOSSAIN,

Defendant.

_____/

DEFENDANT'S SENTENCING MEMORANDUM

SAIFUL HOSSAIN, by and through his undersigned attorney, hereby submits this Sentencing Memorandum for this Honorable Court's consideration. Mr. Hossain requests that this Court determine that a variance from the applicable guideline range is appropriate under 18 U.S.C. § 3553, and thus impose a sentence below the sentence advised by the United States Sentencing Guidelines. In support thereof, Mr. Hossain states the following:

STATEMENT OF FACTS

The Government charged the Defendants Saiful Hossain, Ahmed Khalifa, Tanjina Piya; and Ahmed Elhelw with various controlled substance offenses. (Doc.

3). In particular, the controlled substance in this case involves XLR-11, a substance which is a component of synthetic marijuana.

Notwithstanding the fact that this case involves synthetic marijuana and despite Mr. Hossain's lack of a criminal history, the Presentence Report (PSR) contends that Mr. Hossain's is facing an advisory guideline range of approximately 27 to 34 years of imprisonment. Mr. Hossain previously filed objections to the advisory guideline range calculated by the PSR and supported by the government. (*See* Doc. 195). If this Honorable Court were to sustain Mr. Hossain's objections, his Offense Level would be a level 21. Because Mr. Hossain is in a Criminal History Category of I, he would be facing 3 to 4 years of imprisonment, rather than the 27 to 34 years of imprisonment as asserted in the PSR.

MEMORANDUM OF LAW

Because Mr. Hossain has already filed written objections to the PSR, the purpose of this Memorandum is to address the question of the appropriate sentence under 18 U.S.C. § 3553(a). As the following discussion demonstrates, the harsh advisory guideline range is antagonistic to the principles set forth under that statute. Indeed, a sentencing matrix that compels a minimum sentence of 27-years for substances that serve as replacements for marijuana is not only nefarious in effect, but absurd in design. Accordingly, a variance is warranted in Mr. Hossain's sentence pursuant to the factors set forth in § 3553(a). As this

Memorandum demonstrates, an analysis of § 3553 is critical in Mr. Hossain's case because each of the statutory factors independently supports his request for a variance.

I. ***Booker and its Progeny Provides the Court with the Discretion to Impose a Sentence of Home Detention***

A district court's discretion is no longer limited by the guidelines since its matrix is now considered merely advisory. *United States v. Booker,* 543 U.S. 220, 245-67 (2005). Thus, a court is now unencumbered in its ability "to consider every convicted person as an individual and every case as a unique study in the human failings that sometimes mitigate, sometimes magnify, the crime and the punishment to ensue." *Gall v. United States*, 552 U.S. 38, 53 (2007) (quoting *Koon v. United States,* 518 U.S. 81 (1996)).

Congress has identified four "purposes" of sentencing: punishment, deterrence, incapacitation, and rehabilitation. 18 U.S.C. § 3553(a)(2). To achieve these ends, § 3553(a) requires sentencing courts to consider not only the advisory guidelines range, but also the facts of a specific case through the lens of seven factors, including:

> (1) the nature and circumstances of the offense and the history and characteristics of the defendant;
> (2) the need for the sentence imposed--
> > (A) to reflect the seriousness of the offense, to promote respect for the law, and to provide just punishment for the offense;
> > (B) to afford adequate deterrence to criminal conduct;

> (C) to protect the public from further crimes of the defendant; and
> (D) to provide the defendant with needed educational or vocational training, medical care, or other correctional treatment in the most effective manner;
> (3) the kinds of sentences available;
> (4) the kinds of sentence and the sentencing range established . . .;
> (5) any pertinent [Sentencing Commission] policy statement . . .;
> (6) the need to avoid unwarranted sentence disparities among defendants with similar records who have been found guilty of similar conduct; and
> (7) the need to provide restitution to any victims of the offense.

18 U.S.C. § 3553(a)(1)-(7). The following sections analyze the § 3553 factors against the factual backdrop of Mr. Hossain's case. Such an analysis is critical because it underscores the inherent necessity of a variance in this matter.

1. The Nature and Circumstances of the Offense and the History and Characteristics of the Defendant

A. The Nature and Circumstances of the Offense

Although Mr. Hossain recognizes the seriousness of his offense, he respectfully submits that there are mitigating factors concerning his offense conduct that support a variance in his case including: 1) the unjustified and excessive enhancement of his sentence based on the use of a 1:167 ratio that applies to Tetrahydrocannabinol ("THC"); and 2) Mr. Hossain's attempt to mitigate the effects of his conduct through cooperation with the government.

1. The Use of a 1:167 Ratio is Unwarranted in this Case

a. The substance most closely related to XLR-11 is Marijuana.

In determining Mr. Hossain's sentence, this Court must decide whether XLR-11 is more closely related to "THC" or marijuana. Notwithstanding the government's position, the scientific evidence demonstrates that the most closely related controlled substance to XLR-11 is marijuana, and not THC. The outcome of this dispute will have profound consequences on the calculation of Mr. Hossain's sentence under the Guidelines.

The Presentence Report (PSR) asserts that XLR-11 is synthetic THC. PSR at ¶ 49. This proposition leads to a staggering increase in the drug quantity, since 1 gram of THC is equivalent to 167 grams of marijuana under USSG § 2D1.1. *Id.* Thus, the PSR multiplies the quantity of 216 kilograms of XLR-11 by 167 resulting in a total weight of 36,072 kilograms of marijuana.

The absurdity of this guideline application is established by a consideration of the quantities of other drugs that are equivalent to 30,000 kilograms of marijuana under the guidelines. Indeed, Section 2D1.1(c)(1) provides that an offense level of 36 not only applies to 30,000 kilograms of marijuana, but also equates to 30 to 90 kilograms of heroin, as well as 150 to 450 Kilograms of cocaine. Thus, according to the PSR, Mr. Hossain should be treated the same as a drug trafficker who distributes a half of ton of cocaine.

While such a tenet is facially ridiculous, the truly disturbing aspect of the calculation is its foundation on certain irrational premises. A deconstruction of § 2D1.1 demonstrates this contention.

Application note 6 to U.S.S.G. § 2D1.1 states that in the case of a controlled substance not specifically referenced in the Guidelines, the district court should "determine the base offense level using the marihuana equivalency of the most closely related controlled substance referenced in this guideline." Because XLR-11 is not listed in the applicable sentencing guidelines, the Court must identify the substance that is (a) specifically referenced in the guideline that is (b) most closely related to XLR11.

In making that determination, the Court must consider the following:

> (A) Whether the controlled substance not referenced in this guideline has a chemical structure that is substantially similar to a controlled substance referenced in this guideline.
>
> (B) Whether the controlled substance not referenced in this guideline has a stimulant, depressant, or hallucinogenic effect on the central nervous system that is substantially similar to the stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance referenced in this guideline.
>
> (C) Whether a lesser or greater quantity of the controlled substance not referenced in this guideline is needed to produce a substantially similar effect on the central nervous system as a controlled substance referenced in this guideline.

U.S.S.G. § 2D1.1 cmt. n.6.

As previously noted, the PSR takes the position that that XLR-11 is

essentially equivalent to synthetic THC. PSR at ¶ 49. The science, however, does not bear out any close connection between XLR-11 and THC.

The first guideline factor of whether the two structures are "substantially similar," has little impact on the analysis. As an initial matter, the phrase "substantially similar" is irretrievably vague and "has no scientific meaning." (*See* Declaration of Nicholas v. Cozzi, Ph.D., hereto attached as Exhibit 1 at 1); *see also United States v. Makkar*, No. 14-5147, 2015 WL 7422599, at *1 (10th Cir. Nov. 23, 2015) (noting that it is an "open question . . . what exactly it means for chemicals to have a "substantially similar" chemical structure—or effect" and questioning whether that provision of the Controlled Substance Analogue Enforcement Act, 21 U.S.C. § 813, is unconstitutionally vague in light of *Johnson v. United States*, – U.S. –, 135 S.Ct. 2551 (2015)).

In addition, as Dr. Cozzi notes, "[n]one of the compounds under consideration has a chemical structure that is related to a controlled substance referenced in the sentencing guidelines, nor can any of these compounds be synthesized from a referenced controlled substance." (Ex. 1 at 1). If, however, the Court must choose one substance, the "most closely related" controlled substance to XLR-11 "is marijuana." (*See* Affidavit of Dr. Gregory Dudley, Ex. 2 at 2).

With respect to the second factor – the effect on the user (whether stimulant, depressant, or hallucinogenic), no studies on the substances at issue have ever been

conducted on human beings, so their pharmacological effect is unclear. (Ex. 1 at 2). Although scientists have conducted studies on rodents, such studies are prone to produce false positives and are therefore inherently unreliable. *Id.* Nevertheless, in the view of Dr. Dudley, the "pharmacological effects [of] XLR-11 can be described as a cannabinoid with marijuana-like effects." (Ex. 2 at 2). Dr. Dudley also adds that, since "SSC products [were] designed to mimic the effects of marijuana," the closest listed substance should be marijuana. (*Id.* at 4). Therefore, the second factor weighs in favor of a finding that marijuana is the closest substance listed in U.S.S.G. § 2D1.1.

The third factor – the relative potency of the drug – likewise weighs in favor of the use of marijuana in determining the drug quantity. Dr. Dudley opined that XLR-11, when formulated as an SSC as described in the Presentence Investigation Report, "would be expected to have a potency similar to that of marijuana." (*Id).*

Dr. Cozzi, for his part, states that "not possible to compare the potency of any of these substances to THC." (Ex. 1 at 3). That is because it "is not known whether a lesser or greater quantity of the controlled substance not referenced in the sentencing guidelines is needed to produce a 'substantially similar' effect on the central nervous system as a controlled substance referenced in the sentencing guideline (i.e. THC)." (*Id*). Therefore, in the absence of evidence that could support the multiplication of the drug amount *by a factor of 167*, this Court should

use marijuana, and not THC, as the most closely related substance listed in U.S.S.G. § 2D1.1.

In any case, if, after hearing the testimony presented at the Sentencing Hearing, the Court finds that evidence regarding the foregoing three factors is in equipoise, it should apply the Rule of Lenity and hold Mr. Hossain responsible for lesser amount under the Guidelines. *United States v. Schultz*, 810 F.Supp. 230 (S.D. Ohio 1992) (applying rule of lenity where it was unclear whether substance at issue was hash oil or marijuana resin). Ambiguity in a criminal statute should be resolved in favor of lenity, and the rule of lenity applies to interpretation of the Sentencing Guidelines in the same manner as it applies to criminal statutes. *Id.* at 234 (collecting cases). Therefore, this Court should, at the very least, apply the rule of lenity if it harbors any doubts about the scientific foundation of the evidence offered by the Government.

b. The 167:1 Ratio of THC to Marijuana is Scientifically Unsound.

Another unscientific premise that drives the quantity in this case is the 1:167 ratio itself. Even if this Court finds that THC is the most closely related substance to XLR-11, the following discussion demonstrates that this Court should recognize the absurdity of using a 1:167 ratio that does not accurately reflect the true THC content in marijuana.

It is well-established that a sentencing judge has discretion to impose a

downward variance where he has a policy disagreement with the drug ratios employed in the Sentence Guidelines. *Spears v. United States*, 555 U.S. 261 (2009). As in *Spears*, this case calls for a downward variance because the 1:167 ratio marijuana grossly misstates the THC content found in marijuana used for psychoactive effects.

The ratio of 1:167, if expressed in a percentage, equates to THC content of 0.6%. (Ex. 1 at 4). In reality, the THC content found in marijuana as of 2013 was approximately 14.5%. (*Id*). Thus, the "1:167 multiplier does not accurately reflect the actual THC content of marijuana that is used for medicinal or psychoactive purposes," but instead "artificially inflates the severity of a punishment by using an implausibly low THC content." (*Id*).

According to Dr. Cozzi, the "sentencing guideline miscalculates the actual THC content of present-day marihuana by about 24-fold (14.5/0.6), resulting in a multiplier that is at least 24-fold too high. The multiplier, adjusted for actual present-day THC content in either 'recreational' or medical marijuana, would be about 1:7, not 1:167." *Id.* It follows that the use of the arbitrary 1:167 multiplier is against the weight of scientific evidence and supports a downward variance in fashioning a sentence that is sufficient, but no greater than necessary, to satisfy the goals of sentencing as codified at 18 U.S.C. § 3553(a)(2).

In response to Mr. Hossain's objection on the use of the 1 to 167 ratio, the

Government correctly notes that there is precedent at the district court level that weighs in favor of the use of the 167:1 ratio. In a recent oral argument at the Eighth Circuit Court of Appeals, however, a Circuit Court Judge expressed serious skepticism regarding the use of the ratio. The judge stated that the use of the ratio "bothered him." U.S. Court of Appeals for the Eighth Circuit, Oral Argument in *United States v. Carlson*, Case No. 14-2986, at 53:55, *available at* http://media.ca8.uscourts.gov/cgi-bin/oaByPa.pl?last_name=nyvold&first_name=&getOA=Search (last visited December 4, 2015). The judge questioned the "legal wisdom" of ratio, *id.* at 55:25, and informed counsel for the Government that it struck him as "pretty preposterous." *Id.* at 55:29. Counsel for the Government expressly declined to defend the "legal wisdom" of the ratio, but instead argued that the use of the ratio was procedurally reasonable. *Id.* at 55:34. The appellate judge then questioned the scientific basis underlying the ratio, noting that the THC content approximated what could be found in "rope" or "ditch weed," rather than the substance that people use to "get high." *Id.* at 56:00. Perhaps to alleviate the concerns of the appellate panel, counsel for the Government noted that both sides asked for a downward variance and that the district court granted a downward variance on this basis. *Id.* at 56:58.

Undeterred, the Eighth Circuit judge reiterated his concerns, stating that he interpreted the Government's answer as recognition that the ratio "is not science,"

id. at 59:25, and inquired how to gauge whether there was any procedural error in applying the ratio to this offense. *Id.* 59:42. The judge further suggested that the finding that it was proper to use the ratio could, itself, be procedural error. *Id.* 59:57.

2. Mr. Hossain attempted to cooperate with the government

Although Mr. Hossain attempted to cooperate with the government, his cooperation did not rise to the level of substantial assistance under USSG 5K1.1. Mr. Hossain began to cooperate with the government upon his arrest and also participated in a proffer with the government in which he provided truthful and complete information. Moreover, Mr. Hossain's acceptance of responsibility in this case is further demonstrated by his agreement to surrender the proceeds of his offense, including a business, to the government. PSR at 84.

Although the government has not filed a motion under USSG §5K1.1, Mr. Hossain respectfully submits that this Court should consider his substantial assistance to the government in support of a variance under § 3553(a). *See United States v. Blue,* 557 F.3d 682, 686 (6th Cir. 2009)(stating that post-*Booker*, "the government's failure to file a Section 5K1.1 departure does not necessarily preclude a sentencing court from taking into account substantial assistance when considering the appropriate sentence in light of the Section 3553(a) factors."); *United States v. Doe,* 213 Fed.Appx. 660, 663 (10th Cir. Jan. 12,

2007)(unpub)(holding that district court should address cooperation as part of its §3553(a) analysis even in absence of a 5K1.1 motion when raised by the defendant); *United States v. Ochoa-Ramos*, 2008 WL 2062341, at *3 (E.D.Wis. 2008)(noting the ability to consider cooperation with the government as evidence of defendant's character under §3553(a) beyond a reduction under §3E1.1, even in the absence of a §5K motion from the prosecution).

In the end, Mr. Hossain's failed efforts to assist the government supports a variance since his actions demonstrate his acceptance of responsibility for his criminal conduct and his substantial attempt to make amends for his actions.

B. The History and Characteristics of the Defendant

Pursuant to § 3553(a), a consideration of Mr. Hossain's sentence should take into account his life history. Such an analysis is especially critical in Mr. Hossain's case since his redeeming qualities demonstrate that his criminal actions are truly aberrant when viewed against the backdrop of his entire life. Indeed, the defendant is a man whose existence has been characterized by dedication to his friends and family, as well as a sense of compassion and kindness. (*See* Letters of Support, hereto attached as Composite Exhibit 3). Mr. Hossain's criminal conduct in the instant case constitutes a marked deviation from an otherwise law-abiding life.

Indeed, Mr. Hossain is a 28-year-old man with absolutely no criminal history. Mr. Hossain immigrated to the United States from Bangladesh when he

was thirteen-years old. While learning English, Mr. Hossain attended high school and worked at a fast-food restaurant until he left school to work full-time at his father's convenience store. Although Mr. Hossain left Bangladesh, he still provides support to others in his birth country.[1]

Mr. Hossain has been married since 2009 and is the father of Ariana Piya, who is 2 ½ years old. Mr. Hossain is a dedicated husband and father. He has also been the primary bread winner for his wife and child. The fact that Mr. Hossain is a primary source of financial support for his spouse and child further supports his request for a variance. *See, e.g,* App. Note 1(B) to USSG § 5H1.6 ("Departures Based on Loss of Caretaking or Financial Support"); *United States v. Munoz-Nava*, 524 F.3d 1137 (10th Cir. 2008)(affirming sentence of 366 days, despite guideline range of 46-57 months, based on defendant's work history, community support, lack of criminal record, and caretaking responsibilities for son and elderly parents); *United States v. Lehman*, 513 F.3d 805 (8th Cir. 2008)(probationary sentence affirmed based in part on defendant's need to care for her developmentally-disabled son).

In assessing the positive aspects of Mr. Hossain's life history, it is apparent that a 27 to 34 year sentence is antagonistic to the principles of fairness and justice. The advisory guideline sentence in this case would incarcerate Mr. Hossain until

[1] Evidence concerning Mr. Hossain's acts of charity in Bangladesh will be presented at the time of his sentencing.

his daughter would be approximately 30-years-old. Such a result, in a case involving a substance which was designed to approximate marijuana, defies common-sense.

2. The Need for the Sentence Imposed

A. To reflect the seriousness of the offense, to promote respect for the law, and to provide just punishment for the offense

In imposing "just punishment" for an offense, a sentencing court should not disregard the additional penalties and hardships that will accompany Mr. Hossain. *See* Hugh LaFollette, *Collateral Consequences of Punishment: Civil Penalties Accompanying a Formal Punishment*, 22 J. of Applied Phil., 241, 244-46 (2005)(discussing and critiquing on proportionality grounds retributivist justification of collateral consequences); Jeremy Travis, *Invisible Punishment: An Instrument of Social Exclusion, in Invisible Punishment: The Collateral Consequences of Mass Imprisonment* (Marc Mauer & Meda Chesney-Lind eds., 2002).

Although Mr. Hossain recognizes the seriousness of his offense, he respectfully submits that he has already received and will be subject to substantial punishment for the offense. As a result of the instant offense, Mr. Hossain will be a convicted felon. As such, he will forfeit significant civil rights including his right to vote, run for public office, or serve on a jury. Furthermore, Mr. Hossain's employment prospects will be seriously impaired by his felony conviction. *See*

Christopher Uggen, *Work as a Turning Point in the Life Course of Criminals: A Duration Model of Age, Employment and Recidivism*, American Sociological Review 65:529-46 (2000). Finally, as already noted, Mr. Hossain has also been punished by surrendering most, if not all, of his financial assets to the government.

B. To afford adequate deterrence to criminal conduct

A punishment of imprisonment is not necessary to further the § 3553 factor of general deterrence since there is no correlation between punishment and reductions in crime. (*See* Gary Kleck and J.C. Barnes, *Deterrence and Macro-Level Perceptions of Punishment Risks: Is There a "Collective Wisdom"*?, 59 Crime & Delinquency 1006, 1031-33 (2013), excerpt hereto attached as Ex. 4). Kleck and Barnes' study concludes:

> there is generally no significant association between perceptions of punishment levels and the actual levels of punishment that the criminal justice system achieves. This in turn implies that increases in punishment levels do not routinely reduce crime through general deterrence mechanisms, because the fundamental link between actual punishment levels and perceptions of punishment levels appears to be weak to nonexistent.

(*Id*. at 1031). The United States Department of Justice agrees with the conclusion that incarcerating defendants is not an effective means of deterrence. (*See* U.S. Dept. of Justice, Nat'l Inst. of Justice, *Five Things About Deterrence* (July 2014), hereto attached as Exhibit 5). In fact, the Department of Justice finds that even increasing the severity of punishment does little to deter punishment. (*See id*.).

In the absence of a deterrent effect, Mr. Hossain submits that a sentence of imprisonment is not necessary in his case.

B. to protect the public from further crimes of the defendant;

As in the case of general deterrence, the empirical evidence does not establish a relationship between sentence length and specific deterrence, regardless of the type of crime. David Weisburd *et al., Specific Deterrence in a Sample of Offenders Convicted of White-Collar Crimes*, 33 Criminology 587 (1995) (finding no difference in deterrence for white collar offenders between probation and imprisonment); Donald P. Green & Daniel Winik, *Using Random Judge Assignments to Estimate the Effects of Incarceration and Probation on Recidivism among Drug Offenders*, 48 Criminology 357 (2010) (study of over a thousand offenders whose sentences varied substantially in prison time and probation found that such variations "have no detectable effect on rates of re-arrest," and that "[t]hose assigned by chance to receive prison time and their counterparts who received no prison time were re-arrested at similar rates over a four-year time frame"). Moreover, the United States Sentencing Commission has determined that "[t]here is no correlation between recidivism and guidelines' offense level. . . While surprising at first glance, this finding should be expected. The guidelines' offense level is not intended or designed to predict recidivism." (U.S. Sent'g Comm'n, *Measuring Recidivism: The Criminal History Computation of the*

Federal Sentencing Guidelines, at 15 (2004), excerpt hereto attached as Exhibit 6). In sum, the best available evidence establishes that imprisonment does not reduce recidivism more than noncustodial sanctions. Francis T. Cullen et al., *Prisons Do Not Reduce Recidivism: The High Cost of Ignoring Science*, 91 Prison J. 48S, 50S-51S (2011).

Nevertheless, the need to protect the public from future crimes by the defendant is not an issue since he poses a low risk of recidivism. As previously noted, Mr. Hossain has no criminal history which places him in a Criminal History Category I.

As a first time offender, Mr. Hossain poses a lower risk of recidivism. The United States Sentencing Commission asserts that individuals - like Mr. Hossain - with zero criminal history points are less likely to recidivate than all other offenders. U.S. Sent. Comm., "*Recidivism and the "First Offender"* (May 2004), *available at* http://www.ussc.gov/publicat/Recidivism_ FirstOffender.pdf. Studies by the Sentencing Commission establish that the recidivism rate for such individuals is substantially lower than recidivism rates for other offenders, including offenders with only one criminal history point. *Id.* at 13. In addition, for white offenders in Criminal History Category I, the recidivism rate is 8.9%. (*See, e.g.*, Exhibit 6 at p. 28). Finally, because of his marital status, family support, and employment history, Mr. Hossain poses an even lower low risk of recidivism. (*Id.*

at p. 29).

In imposing the least sentence sufficient to account for the need to protect the public from further crimes of Mr. Hossain, this Court should consider the statistically low risk of recidivism presented by Mr. Hossain. *United States v. Urbina*, slip op., 2009 WL 565485, *3 (E.D. Wis. Mar. 5, 2009) (considering low risk of recidivism indicated by defendant's lack of criminal record, positive work history, and strong family ties); *United States v. Cabrera*, 567 F. Supp. 2d 271, 279 (D. Mass. 2008) (granting variance because defendants "with zero criminal history points are less likely to recidivate than all other offenders").

C. to provide the defendant with needed educational or vocational training, medical care, or other correctional treatment in the most effective manner;

This factor also weighs in favor of a variance. Mr. Hossain does not require medical treatment and vocational training. Although he would like to obtain his GED and participate in a drug treatment program in the Federal Bureau of Prisons, a 27 to 34 year prison sentence is not necessary to accomplish these goals.

3. The Kinds of Sentences Available

A mandatory minimum sentence does not apply in Mr. Hossain's case, thus a sentence below the advisory guideline range is permissible.

4-5. The Kinds of Sentences and the Guideline Sentencing Range Established and any Pertinent Sentencing Commission Policy Statements

Although the impact of the guidelines on a court's sentencing discretion has been discussed in Section I, *supra*, the critical question in Mr. Hossain's case is the exact weight this Court should give to the guidelines. As recognized in *Gall*, district courts "may not presume that the Guidelines range is reasonable." 552 U.S. at 49, 128 S. Ct. at 597. Thus, mitigating circumstances and substantive policy arguments that were formerly irrelevant in all but the most unusual cases are now potentially relevant in every case.

The guidelines pose a particular risk in Mr. Hossain's case for a more elemental reason – they falsely provide a promise of predictability and fairness. We look to the guideline matrix, with its façade of mathematics, to relieve us of the uncertainty of unpredictable or irrational sentences. In effect, they provide us with a sheltering sky against a great dark abyss.[2] Because we believe the guidelines to be the product of great deliberation and reasoned judgment, we often assume that they provide clear direction for the proper sentencing of every criminal defendant, notwithstanding their backgrounds and the particular circumstances of their case.[3]

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[2] *See* Paul Bowles, *The Sheltering Sky* (Random House 1949)("The sky hides the night behind it and shelters the people beneath from the horror that lies above.").

[3] Of course, the guidelines do address the background of each defendant and the circumstances of each case in a limited fashion through criminal history and offense conduct.

See, *e.g.*, *Kimbrough*, 552 U.S. at 96, *Gall*, 552 U.S. at 46 (noting that the Guidelines are "the product of careful study based on extensive empirical evidence derived from the review of thousands of individual sentencing decisions."). Thus, we look to the guidelines to relieve us of the burden of having to decide a just sentence for a particular defendant. *See Kimbrough*, 552 U.S. at 109 (noting that in many cases the Guidelines represent a reasonable estimation of a fair sentencing range). But such security is a false god and every time we make a sacrifice to it we are lost.[4] Indeed, the guideline ranges have often and dramatically let us down in creating results that are fundamentally unjust. For instance, for years, the guidelines for crack cocaine created a situation where defendants were harshly and unfairly sentenced.

Such is the case with the guidelines in the instant case. As previously noted, the government's conception of the guidelines in this case is necessarily driven by the application of a 1 to 167 ratio that is invalid. Moreover, the PSR's calculated sentence of 27 to 34 years is predicated on drug guidelines that a majority of federal judges believe are too harsh. Indeed, "73.7 percent of district court judges and 82.7 percent of circuit court judges [rate] drug punishments as greater than appropriate to reflect the seriousness of drug trafficking offenses." (*See* USSC, *Fifteen Years of Guideline Sentencing, An Assessment of How Well the Criminal*

[4] *See* Bowles, *Sheltering Sky,* ("Security is a false God. Begin to make sacrifices to it and you are lost.").

Justice System is Achieving the Goals of Sentencing Reform, at 52. (November 2004), excerpt hereto attached as Exhibit 7).

Because of the recurring and essential problems with the guidelines, drug sentences necessarily reflect widespread judicial disagreement with the guidelines. For example, in fiscal year 2014, sentences below the guideline range were imposed in over 60% of all drug cases, including departures that were government sponsored. (*See* U.S. Sent'g Comm'n, *2014 Sourcebook of Federal Sentencing Statistics*, tbl.27, hereto attached as Exhibit 8).

The problem that the guidelines pose in Mr. Hossain's case is that with their false promise of certainty, they cannot account for the unique factors of his case which support his request for a variance. Thus, the guidelines necessarily violate the tenant that a sentencing court should "consider every convicted person as an individual and every case as a unique study in the human failings that sometimes mitigate, sometimes magnify, the crime and the punishment to ensue." *Gall*, 552 U.S. at 53 (citation omitted).

6. The Need to Avoid Unwarranted Sentence Disparities Among Defendants With Similar Records Who Have Been Found Guilty of Similar Conduct

The undersigned will address this factor at the time of Mr. Hossain's sentencing.

7. The Need to Provide Restitution to Any Victims of the Offense.

Restitution is not applicable in this case.

CONCLUSION

As the foregoing establishes, the unique circumstances presented in Mr. Hossain's case warrant a variance below the applicable guideline range. Because the decision in *Booker* has made the Guidelines advisory and the parsimony clause of 18 U.S.C. § 3553(a) the paramount consideration, Mr. Hossain respectfully submits that a variance is appropriate pursuant to this significant and paramount sentencing statute.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that on December 7, 2015, I electronically filed the foregoing using the CM/ECF system for the Southern District of Florida.

/s/ Fritz Scheller
Fritz Scheller

EXHIBIT 1

DECLARATION OF NICHOLAS V. COZZI, Ph.D.

I. My name is Nicholas Vito Cozzi. I am currently a scientist and educator in the Department of Cell and Regenerative Biology at the University of Wisconsin School of Medicine and Public Health in Madison, WI. I hold a B.S. degree in Pharmacology and Toxicology and a Ph.D. degree in Pharmacology from the University of Wisconsin School of Pharmacy. I teach Medical Pharmacology to second-year medical students and I teach various courses in Pharmacology and Toxicology to undergraduate students, M.D. and Ph.D. students, pharmacy students, and veterinary students.

II. I have approximately 30 years of research experience in the design, chemical synthesis, and pharmacological testing of novel compounds. My research involves the design, chemical synthesis, and pharmacological testing of substances with central nervous system activity, especially those with psychostimulant, hallucinogenic, and antidepressant effects. My laboratory is interested in how these agents act in the brain to affect awareness, cognition, and mood, and in their clinical applications in treating addiction, anxiety, depression, post-traumatic fear, and other mental health ailments. I have published the results of my research in international peer-reviewed scientific journals beginning in 1991 and continuing through the present. My qualifications and experience are detailed in my curriculum vitae, which is attached.

III. I have been asked to comment on the chemical and pharmacological properties of several compounds with respect to the United States Sentencing Commission Guidelines Manual § 2D1.1, Application Note 6 (hereafter referred to as "sentencing guidelines"). I have also been asked to render an opinion regarding the sentencing multiplier used in the Drug Equivalency Tables in U.S.S.C. § 2D1.1 to compare Δ9-tetrahydrocannabinol (THC) with marihuana.

A. The compounds are: **5F-AB-PINACA** (*N*-[1-amino-3-methyl-1-oxobutan-2-yl]-1-[5-fluoropentyl]-1H-indazole-3-carboxamide), **5F-ADBICA** (*N*-[1-amino-3,3-dimethyl-1-oxobutan-1-yl]-1-[5-fluoropentyl]-1H-indole-3-carboxamide), **AB-CHMINACA** (*N*-[1-amino-3-methyl-1-oxobutan-2-yl]-1-[cyclohexylmethyl]-1H-indazole-3-carboxamide), **AB-FUBINACA** (*N*-[1-amino-3-methyl-1-oxobutan-2-yl]-1-[4-fluorobenzyl]-1H-indazole-3-carboxamide), **AB-PINACA** (*N*-[1-amino-3-methyl-1-oxobutan-2-yl]-1-pentyl-1H-indazole-3-carboxamide), **FUB-PB-22** ([quinolin-8-yl-1-(4-fluorobenzyl)-1H-indole-3-carboxylate]), **PB-22** (1-pentyl-1H-indole-3-carboxylic acid 8-quinolinyl ester), and **XLR-11** ([1-(5-fluoropentyl)-1H-indol-3-yl][2,2,3,3-tetramethylcyclopropyl] methanone).

B. According to section 49 (Offense Level Computation) in document 159, (Presentence Investigation Report), it is claimed that XLR-11 is "a synthetic tetrahydrocannabinol (THC)" for sentencing purposes.

IV. According to the sentencing guidelines, "[I]n the case of a controlled substance that is not specifically referenced in this guideline, determine the base offense level using the marihuana equivalency of the most closely related controlled substance referenced in this guideline. In determining the most closely related controlled substance, the court shall, to the extent practicable, consider the following: (A) Whether the controlled substance not referenced in this guideline has a chemical structure that is substantially similar to a controlled substance referenced in this guideline. (B) Whether the controlled substance not referenced in this guideline has a stimulant, depressant, or hallucinogenic effect on the central nervous system that is substantially similar to the stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance referenced in this guideline. (C) Whether a lesser or greater quantity of the controlled substance not referenced in this guideline is needed to produce a substantially similar effect on the central nervous system as a controlled substance referenced in this guideline."

A. The phrase "substantially similar" is vague, has no scientific meaning, and has not been defined in any Federal drug laws.

B. None of the compounds under consideration has a chemical structure that is related to a controlled substance referenced in the sentencing guidelines, nor can any of these compounds be synthesized from a referenced controlled substance.

C. None of the listed substances have been tested in humans. Therefore, it is not known whether any of the substances has an effect on users that resembles the stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance referenced in the sentencing guidelines.

D. Several of the compounds have been studied in rats and mice but not in human beings. Therefore, it is not known whether any of these substances has an effect in users that resembles the stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance (i.e. THC) referenced in the sentencing guidelines.

1. AB-FUBINACA and AB-PINACA were injected into rats and were shown to affect body temperature and heart rate in these animals (Banister et al., 2015). This study did not examine whether either of these compounds have a stimulant, depressant, or hallucinogenic effect on the central nervous system.

2. AB-CHMINACA, AB-PINACA, and XLR-11 were injected into mice for testing using drug discrimination assays in comparison to THC (Wiley et al., 2013; Gatch and Forster, 2015; Wiley et al., 2015).

i. While there exists much literature showing that drug discrimination studies in animals can separate drugs into classes that have similar effects in humans (including drugs with THC-like effects), there are important exceptions and limits to the drug discrimination approach. Animal drug discrimination tests are not always reliable.

ii. Animal drug discrimination assays are known to produce "false positives" regarding subjective effects in humans. For example, the drugs lisuride, quipazine, and yohimbine substitute for the hallucinogen LSD in animal drug discrimination assays (Appel et al., 2004), which could lead one to conclude that these drugs would be LSD-like in humans. However, these drugs are known NOT to be hallucinogenic in humans. Thus drug discrimination assays conducted in animals can lead to erroneous conclusions because of false positive responses. False positive results cast doubt on the reliability of such assays to predict whether the "subjective effects" of drugs tested in animals "are substantially similar" to drug effects produced in human beings.

iii. Likewise, there is not always a correspondence between THC-like stimulus effects in animals and a drug's ability to produce a THC-like intoxication in humans.

a. Drugs that produce psychoactive effects that are unlike THC in humans can nevertheless produce THC-like responses in animals. For example, the drugs MDMA, diazepam, and pentobarbital partially or fully substitute for THC in animal drug discrimination tests (Mokler et al., 1986; Barrett et al., 1995). These drugs are known NOT to be THC-like in human beings.

b. On the other hand, some compounds that are known to produce THC-like effects in humans fail to substitute for THC in animals (Hollister, 1974; Balster and Prescott, 1992).

iv. Therefore, it is wrong to conclude that if a new drug or unknown compound has discriminative stimulus effects in animals similar to a known drug of abuse, this new drug or unknown substance will produce pharmacological and subjective

effects in humans that are similar to the known drug of abuse and would be similarly abused by humans.

3. 5F-AB-PINACA, 5F-ADBICA, and FUB-PB-22 have not been tested for behavioral effects whatsoever. It is therefore not possible to state what the nature of any supposed behavioral effects might be or if the compounds would even be psychoactive.

4. No human studies have been published which compare the pharmacological effects of these compounds to THC or to marijuana. Therefore, it is not known whether these substances would be perceived to be THC-like by users or whether a lesser or greater quantity would be needed to produce an effect on the central nervous system as a controlled substance (i.e. THC) referenced in the sentencing guidelines. The lesser or greater quantity is a measure of "potency". Potency refers to the size of a dose or the concentration of a drug required to produce a specific effect.

   i. Because there are no studies establishing a specific dose-related effect of the compounds in humans, it is not possible to compare the potency of any of these substances to THC; specifically, it is not known whether a lesser or greater quantity of the controlled substance not referenced in the sentencing guidelines is needed to produce a "substantially similar" effect on the central nervous system as a controlled substance referenced in the sentencing guideline (i.e. THC).

   ii. Neither *in vitro* nor animal data are accepted by the scientific or medical comunities, or regulatory agencies including the Food and Drug Administration (FDA), to be a sufficient basis from which to draw conclusions regarding drug responses or potencies in humans. These data cannot establish whether a new compound will have an effect in humans, nor the dose required to produce an effect, if one exists. In fact, because of the failure of *in vitro* and animal testing to reliably predict drug effects in humans, over 90% of potential new drugs are rejected by the FDA for human use (DiMasi et al., 2003).

E. While THC may produce a unique constellation of psychoactive effects including euphoria, dizziness, easy laughing, elation, heightened awareness, analgesia, and sleepiness, it is not correctly classified as a stimulant, depressant, or hallucinogen. In particular, THC is not accurately described as a "hallucinogen" under any current scientific or medical classification scheme.

   1. As defined by pharmacologists, drug abuse specialists, medical doctors, neuroscientists, and other drug professionals, the term "hallucinogen" refers to drugs whose primary effects mimic the effects produced by lysergic acid diethylamide (LSD), mescaline, and psilocybin. Another term for these substances is "psychedelic" (Nichols, 2004). Neither THC nor any of the compounds under discussion mimics the effects of LSD, mescaline, or psilocybin.

   2. Many drugs can produce hallucinations as a side-effect in some individuals. For example, the Attention Deficit Hyperactivity Disorder drug amphetamine (Adderall®), the anti-Parkinson's disease drugs levodopa (Larodopa®) and pramipexole (Mirapex®), and the anti-HIV drug efavirenz (Sustiva®) can produce hallucinations at normal, recommended doses. However, it would be wrong to categorize these agents as "hallucinogenic".

V. According to section 49 (Offense Level Computation) in document 159, (Presentence Investigation Report), it is claimed that XLR-11 is "a synthetic tetrahydrocannabinol (THC)" for sentencing purposes.

   A. XLR-11 is not "a synthetic tetrahydrocannabinol". XLR-11 is a unique chemical substance unrelated to tetrahydrocannabinol.

B. According to the U.S.S.C. § 2D1.1, n.8(D), 1 gram of THC, whether synthetic or organic, is made equivalent to 167 grams of marihuana.

C. The THC content calculated by this guideline and expressed as a THC percent = 1/167 x 100 = 0.6%. Marihuana with a THC percent of less than 1% is called "ditchweed" or "industrial hemp" and is used for manufacturing (e.g., hemp cloth, hemp rope) or in the food industry (e.g., hemp seed oil, hemp protein) (Holler et al., 2008). This grade of marijuana is not used for psychoactive effects.

1. The 1:167 multiplier does not accurately reflect the actual THC content of marijuana that is used for medicinal or psychoactive purposes. The multiplier artificially inflates the severity of a punishment by using an implausibly low THC content.

2. The National Institute on Drug Abuse maintains a marijuana Potency Monitoring Program directed by Dr. Mahmoud A. ElSohly at the National Center for Natural Products Research at the University of Mississippi School of Pharmacy, University, MS. This program provides analytical potency data for marijuana seized in the United States.

3. According to the Potency Monitoring Program test results, marihuana cultivated for psychoactive effects had a THC content in the 3.4-5.8% in 1993. The THC content increased to over 14.5% by 2013. (Mehmedic et al., 2010; Botticelli, 2014).

4. Therefore the sentencing guideline miscalculates the actual THC content of present-day marihuana by about 24-fold (14.5/0.6), resulting in a multiplier that is at least 24-fold too high. The multiplier, adjusted for actual present-day THC content in either "recreational" or medical marijuana, would be about 1:7, not 1:167.

VI. Summary

A. None of the substances under discussion is "substantially similar" in chemical structure to a controlled substance referenced in the sentencing guidelines.

B. None of the substances under discussion have been scientifically assessed in human users.

1. Neither *in vitro* data nor animal data are a sufficient basis from which to draw conclusions regarding drug effects or drug potencies in human users.

C. The 1:167 sentencing multiplier appears to be unreasonable. It is based on the THC content of industrial hemp, not psychoactive marijuana.

12/4/2015

X

Nicholas V. Cozzi, Ph.D.

Signed by: Nicholas V. Cozzi

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EDUCATION

Ph.D., Pharmacology — **1994**
University of Wisconsin-Madison School of Pharmacy
Doctoral Thesis: *Pharmacological Studies of Some Psychoactive Phenylalkylamines: Entactogens, Hallucinogens, and Anorectics*

B.S., Pharmacology and Toxicology — **1988**
University of Wisconsin-Madison School of Pharmacy

AWARDS AND GRANTS

Neuropharmacology Research Grant, Usona Institute	**2011 – Present**
Wisconsin Medical Alumni Association Distinguished Basic Science Teaching Award	**2013**
University of Wisconsin Professional Development Grant	**2008 – 2009**
National Institute on Drug Abuse Grant DA017675	**2004 – 2007**
Brody Basic Science Incentive Award, Brody School of Medicine, East Carolina University	**2001 – 2002**
Excellence in Teaching Award, Brody School of Medicine, East Carolina University	**2000**
Brain and Behavior Research Foundation (formerly NARSAD) Young Investigator Award	**1997 – 2000**

TEACHING EXPERIENCE

Visiting Professor: Human Services 1130 (undergraduate course) — **2011 – Present**
College of DuPage, Glen Ellyn, IL
Topic: Molecular and cellular mechanisms of psychedelic drug action

Course Director, Lecturer: Medical Pharmacology (Foundations of Medicine 1-4, Integrated Nervous System; professional/graduate courses) — **2007 – Present**
University of Wisconsin School of Medicine and Public Health, Madison, WI
Topics: General principles, drug disposition, autonomic and neuromuscular drugs, cardiovascular and blood drugs, central nervous system agents, gastrointestinal drugs,

chemotherapeutics, autacoid pharmacology, endocrine drugs, botanicals, toxicology, immunopharmacology, therapeutic drug monitoring, drug interactions

Visiting Professor: Foundations of Psychedelic Studies (undergraduate course) **1986 – 2013**
Northern Illinois University, DeKalb, IL
Topic: Pharmacology of psychedelic agents

Lecturer: Molecular Principles in Pharmacology (graduate course) **2011 – 2013**
University of Wisconsin School of Medicine and Public Health, Madison, WI
Topics: General principles, drug disposition, autonomic and neuromuscular drugs, central nervous system agents, autacoid pharmacology

Lecturer: Basic and Clinical Veterinary Therapeutics (professional course) **2009**
University of Wisconsin School of Veterinary Medicine, Madison, WI
Topics: Pharmacotherapy of pancreatic, adrenal, and thyroid disorders

Course Director, Lecturer: Physiology in Pharmacology (graduate course) **2008 – 2011**
University of Wisconsin School of Medicine and Public Health, Madison, WI
Topics: Homeostasis, cell structure, movement across membranes, neuronal signaling, sensory physiology, brain, muscle, endocrine, reproduction, cardiovascular system, pulmonary, renal, gastrointestinal, metabolism, immunology

Lecturer: Laboratory Techniques in Pharmacology and Toxicology (graduate course) **2007 – 2012**
University of Wisconsin School of Pharmacy, Madison, WI
Topic: Pharmacology of neurotransmitter uptake transporters

Course Director, Lecturer: Pharmacology (professional course) **2005 – 2007**
Carroll University, Waukesha, WI
Topics: General principles, drug disposition, autonomic and neuromuscular drugs, cardiovascular and blood drugs, central nervous system drugs, gastrointestinal drugs, chemotherapeutics, autacoid pharmacology, endocrine drugs, botanicals, toxicology, drug interactions

Lecturer: Physiological Proteogenomics (graduate course) **2003 – 2004**
Brody School of Medicine, East Carolina University, Greenville, NC
Topic: Applications of proteome analysis to drug development and toxicology

Course Director, Lecturer: Pharmacology Seminar (graduate course) **2001 – 2004**
Brody School of Medicine, East Carolina University, Greenville, NC

Lecturer: Molecular Pharmacology (graduate course) **2000 – 2004**
Brody School of Medicine, East Carolina University, Greenville, NC
Topics: Receptor kinases, neurotransmitter transporters, cell adhesion molecules, site-directed mutagenesis, chimeras, positron emission tomography

Course Director, Lecturer: Laboratory Research Techniques (graduate course) **2000 - 2004**
Brody School of Medicine, East Carolina University, Greenville, NC
Topics: Neurotransmitter transporter assays, cell culture techniques, polymerase chain reaction

Lecturer: Central Nervous System Pharmacology (graduate course) **1999 – 2004**
Brody School of Medicine, East Carolina University, Greenville, NC
Topics: Neurotransmitter receptors, gene knockouts, synaptic vesicle storage and release mechanisms

Lecturer: Cellular and Molecular Neuroscience (graduate course) **1999 – 2004**
Brody School of Medicine, East Carolina University, Greenville, NC
Topics: Neurotransmitter receptors, neurotransmitter transporters

Lecturer: Medical Pharmacology (professional/graduate course) **1998 – 2004**
Brody School of Medicine, East Carolina University, Greenville, NC
Topics: General principles, receptor mechanisms, dose-response relationships, absorption, distribution, metabolism, excretion, pharmacokinetics, drug interactions

Lecturer: Pharmacology (professional course) **1995 – 1998**
University of Wisconsin School of Pharmacy, Madison, WI
Topic: Cardiovascular pharmacology

Lecturer: Environmental Toxicology (graduate course) **1994 – 1998**
Center for Environmental Toxicology, University of Wisconsin-Madison, Madison, WI
Topics: Neurotoxicology, gastrointestinal toxicology

Teaching Assistant: Pharmacy curriculum (various undergraduate Pharmacy courses) **1989 – 1994**
University of Wisconsin School of Pharmacy, Madison, WI

Graduate Students
Dr. LuAnn Cuthbertson-Lucas; received Ph.D. 2001
Dr. Kevin Foley; received Ph.D. 2002
Dr. Kevin DeSanty; received Ph.D. 2002
Dr. Jessica Gaskey-Sharpe; received Ph.D. 2004

PUBLICATIONS

Refereed

CW Schindler, EB Thorndike, S Goldberg, KR Lehner, **NV Cozzi**, SD Brandt, MH Baumann. Reinforcing and neurochemical effects of the "bath salts" constituents 3,4-methylenedioxypyrovalerone (MDPV) and 3,4-methylenedioxy-*N*-methylcathinone (methylone) in male rats. *Psychopharmacology* (2015) doi: 10.1007/s00213-015-4057-0

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RJ Roman, **NV Cozzi**, SH Nye, AJ Dahly-Vernon, JF Baye, DL Evans, YA Evrard, SK Korb, LH Lapczynski, JA O'Connor, HJ Vernon, AL Wittenburg, HJ Jacob. Combinatorial rat panels for predictive toxicology. *Toxicol. Pathol., 34*, P27 (2006)

AL Wittenburg, JA O'Connor, DL Evans, YA Evrard, LH Lapczynski, SK Korb, HJ Vernon, SH Nye, **NV Cozzi**, AJ Dahly-Vernon, HJ Jacob, RJ Roman. Acceleration of diabetic nephropathy in the T2DN rat. *Amer. Diabetes Assoc. 66th Annual Scientific Sessions*, 2186-PO (2006)

JA O'Connor, LH Lapczynski, AJ Dahly-Vernon, YA Evrard, DL Evans, AL Wittenburg, SK Korb, SH Nye, HJ Vernon, **NV Cozzi**, HJ Jacob, RJ Roman. Delay in the progression of diabetic nephropathy in the T2DN rat. *Amer. Diabetes Assoc. 66th Annual Scientific Sessions*, 2185-PO (2006)

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YA Harrington, SK Korb, **NV Cozzi**, SH Nye, AL Wittenburg, HJ Vernon, DL Evans, JA O'Connor, LH Lapczynski, AJ Dahly-Vernon, JF Baye, RJ Roman, HJ Jacob. Using PharmGenix rats to detect tacrine hepatotoxicity. *Clin. Pharmacol. Ther., 79*, P82 (2006)

NV Cozzi, D Marona-Lewicka, DE Nichols, A Gokin, KF Foley. Novel aminopropiophenones as antiobesity agents. *Soc. Neurosci. Abs., 31*, 533.5 (2005)

SH Nye, **NV Cozzi**, JF Baye, DL Evans, YA Evrard, SK Korb, JA O'Connor, HJ Vernon, AL Wittenburg, M Hessner, X Wang, HJ Jacob, RJ Roman. Does the lack of genetic diversity in animal models currently used for safety testing put the public at risk? *FDA Science Forum Abs.*, 305 (2005)

KF Foley, RA Galbraith, A Gokin, **NV Cozzi**. Novel aminopropiophenones as antiobesity agents. *Exp. Biol. Abs., 19*, 85.10 (2005)

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KF Foley, ME Van Dort, **NV Cozzi**. Stereochemical effects of *meta*-hydroxyephedrine isomers at monoamine uptake transporters: a structure-activity study. *Soc. Neurosci. Abs., 26,* 819.20 (2000)

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A Boileau, **NV Cozzi**, P Chen, C Czajkowski. Identification of GABA- and diazepam-responsive regions of the $GABA_A$ receptor using $\gamma2/\alpha1$ subunit chimeras. *Soc. Neurosci. Abs., 22,* 509.3 (1996)

MH Weiler, D Katz, H.-J Lee, **NV Cozzi**, K Das Gupta. Inositol phosphate (IP) accumulation in rat neostriatal slices under conditions used to monitor neurotransmitter release. *Sac. Neurosci. Abs., 17,* 173.9 (1991)

Invited Reviews and Other Publications

NV Cozzi. Psychedelic breakthroughs in neuroscience: how psychedelic drugs influenced the growth and development of psychopharmacology. *Multidisc. Assoc. Psychedelic Studies, 23 (1),* 16-19 (2013)

Editor: *The Shulgin Index*, AT Shulgin, PF Daley, T Manning (2011). Transform Press, Berkeley, CA 94712. ISBN: 978-0-9630096-3-0

Book review: *Psychedelic Medicine: New Evidence for Hallucinogens as Treatments*, TB Roberts, MJ Winkelman, Eds. (2007) Praeger/Greenwood, Westport, CT 06880. ISBN: 0-275-99023-0

RA Sewell, M Baggott, **NV Cozzi**, R Doblin, R Forte, M Franklin, NM Goldsmith, P Goodwin, C Guillot, J Hanna, J Holmes, I Jerome, S Kumar, CD Lovett, D Merkur, J Onnie-Hay, E Peden, TB Roberts, MA Ruderman, K Sachs, TC van Veen. So you want to be a psychedelic researcher? *The Entheogen Review, 15,* 41-47 (2006)

Contributing Editor: *Psychedelics* in *Alterations of Consciousness: An Empirical Analysis for Social Scientists*, I Baruss (2003). American Psychological Association Books, Washington, DC 20002. ISBN: 1-S57-98993-1

NV Cozzi. SB-207266, an orally active 5-HT_4 receptor antagonist for the treatment of irritable bowel syndrome. *Curr. Res. Serotonin, 3,* 11S-118 (1998)

Contributing Editor: *Peyote and the Native American Church* in *Peyote*, N Ross-Flanigan (1997). Berkeley Heights, NJ 07922. ISBN: 0-8949085-1-0

Contributing Editor: *Toxicity of Ecstasy* in *Ecstasy Reconsidered*, N Saunders (1997). Turnaround Press, London, England. ISBN: 0-9530065-0-6

NV Cozzi. SDZ-HTF-919, a 5-HT_4 receptor partial agonist for the treatment of gastrointestinal motility disorder and irritable bowel syndrome. *Curr. Drugs Serotonin ID Res. Alert, SDZ-HTF-919,* ISSN 1361 6285 (1997)

NV Cozzi. A review of the chemistry and pharmacology of CV-5197, a 5-HT_2 receptor antagonist. *Curr. Drugs Serotonin ID Res. Alert, CV-5197,* ISSN 1361 6285 (1997)

NV Cozzi. Effects of water filtration on marijuana smoke: a literature review. *Multidisc. Assoc. Psychedelic Studies, 4, (2),* 4-6 (1993)

SERVICE

Peer reviewer for the following scientific journals:
Archives of Toxicology
Bioorganic & Medicinal Chemistry
Bioorganic & Medicinal Chemistry Letters
CNS Neurascience & Therapeutics
Drug Testing and Analysis
Journal of Neurochemistry
Journal of Neural Transmission
Psychopharmacology

Educational Policy Council — **2007 – 2010**
University of Wisconsin School of Medicine and Public Health

Year 2 Course Directors' Committee for the accreditation report to the Liaison Committee on Medical Education (LCME) — **2009**
University of Wisconsin School of Medicine and Public Health

Medical Students Committee report to the Liaison Committee on Medical Education (LCME) — **2009**
University of Wisconsin School of Medicine and Public Health

Year 2 Grading Subcommittee co-chair, Educational Policy Council — **2009**
University of Wisconsin School of Medicine and Public Health

Year 2 Curriculum Steering Committee — **2008 – 2009**
University of Wisconsin School of Medicine and Public Health

Research Proposal Reviewer — **2001**
Dept. of Veterans Affairs, Office of External Reviews, Neurobiology-D
VA Palo Alto Healthcare System-Livermore Division, Livermore, CA

Neuroscience Steering Committee — **2000 – 2004**
Brody School of Medicine, East Carolina University, Greenville, NC

Neuroscience Symposium Organizing Committee — **2000 – 2004**
Brody School of Medicine, East Carolina University, Greenville, NC

Neuroscience Doctoral Program Curriculum Committee **2000 – 2004**
Brody School of Medicine, East Carolina University, Greenville, NC

United States Pharmacopeial Convention (USP) **2000**
Quinquennial Meeting 2000 Alternate Delegate

Consulting Editor: *Journal of Drug Education and Awareness* **1999 – 2004**

Telemedicine Distance Learning Committee **1999 – 2004**
Brody School of Medicine, East Carolina University, Greenville, NC

Judge: Carol Volkman Awards, Doctoral Student Research Day **1999 – 2000**
Brody School of Medicine, East Carolina University, Greenville, NC

PRESENTATIONS AND PROFESSIONAL ACTIVITIES

Psychedelics: Past, Present, and Future **October 19, 2015**
Presentation with Michael Crowley, Allan Ajaya, Ph.D.
Sponsored by the Wisconsin Union Directorate, University of Wisconsin-Madison

Magic Mushroom Medicine **June 29, 2015**
Presentation, California Institute for Integral Studies, San Francisco, CA
Sponsored by ERIE: Entheogenic Research, Integration, and Education

Magic Mushroom Medicine **May 4, 2015**
Presentation with Adele Getty, M.A.
Sponsored by the Wisconsin Union Directorate, University of Wisconsin-Madison

Hofmann's Potion **October 20, 2014**
Presentation with Thomas Roberts, Ph.D., Bruce Sewick, M.A., Connie Littlefield
Sponsored by the Wisconsin Union Directorate, University of Wisconsin-Madison

Neurons to Nirvana: Understanding Psychedelic Medicines **April 7, 2014**
Presentation with Thomas Roberts, Ph.D., Bruce Sewick, M.A., Oliver Hockenhull
Sponsored by the Wisconsin Union Directorate, University of Wisconsin-Madison

Psychedelics: Science and Spirit **November 16, 2013**
Presentation, Chicago Consciousness Café, Chicago, IL

Molecules, Mind States, and Mystical Experiences-Insights from the Study of Psychedelics **November 16, 2013**
Presentation with Thomas Roberts, Ph.D. and Bruce Sewick, M.A.
Sponsored by the College of DuPage, Glen Ellyn, IL

Psychedelics: Science and Spirit; DMT: The Spirit Molecule **November 11, 2013**
Presentation with Natalie Metz, N.D. and Mitch Schultz
Sponsored by the Wisconsin Union Directorate, University of Wisconsin-Madison

A Psychedelic Conversation: Pharmacology, The Shulgin Farm Report, Creativity and Problem Solving **April 29, 2013**
Presentation with Paul Daley, Ph.D. and James Fadiman, Ph.D.

Sponsored by the Wisconsin Union Directorate, University of Wisconsin-Madison

Indolethylamine *N*-methyltransferase expression in primate nervous tissue. **April 19, 2013**
Presentation, Psychedelic Science 2013, Oakland, CA

Psychedelics in the 21st Century: Pharmacology of Psychedelic Agents **November 3, 2012**
Presentation, College of DuPage, Glen Ellyn, IL

Psychedelics: Breakthroughs in Neuroscience, Therapeutics, and Humanitites **May 7, 2012**
Presentation with Thomas Roberts, Ph.D. and Bruce Sewick, M.A.
Sponsored by the Wisconsin Union Directorate, University of Wisconsin-Madison

Molecular and Cellular Principles of Psychedelic Drug Action **December 12, 2011**
Presentation and workshop, Cartographie Psychedelica, Oakland, CA

Is *N,N*-Dimethyltryptamine (DMT) a Neurotransmitter? **October 17, 2010**
Presentation, Chicago Consciousness Café, Chicago, IL

Recent Developments in *N,N*-Dimethyltryptamine (DMT) Pharmacology **April 16, 2010**
Presentation, Psychedelic Science in the 21st Century, San Jose, CA

Enhancing the Professional Culture of Schools of Medicine: Relationship-Centered Care Initiative Immersion Conference II **May 22-25, 2007**
Indiana University School of Medicine and Regenstrief Institute, Indianapolis, IN

NIH Summit Workshop on Predictive Toxicology **June 15-17, 2004**
National Institutes of Health Campus, Bethesda MD

New Ways to Skin a Cat **October 15, 2003**
Presentation, PhysioGenix, Wauwatosa, WI

Discovery Channel Unsolved History Episode 23, Salem Witch Trials: Stability of ergot alkaloids under conditions of extreme heat **October 22, 2003**

Discovery Channel Unsolved History Episode 21, Death of Marilyn Monroe: Pharmacokinetics of pentobarbital absorption **October 1, 2003**

Another Way To Skin A Cat(hinone) **June 15, 2003**
Presentation, Dept. of Pharmaceutical Sciences
University of Wisconsin School of Pharmacy, Madison, WI

Novel Monoaminergic Agents **October 15, 2002**
Presentation, Dept. of Cellular and Molecular Pharmacology
Chicago Medical School, Finch University of Health Sciences, North Chicago, IL

Novel Monoaminergic Agents **March 8, 2002**
Presentation, Dept. of Chemistry
East Carolina University, Greenville, NC

Novel Monoaminergic Agents **February 21, 2002**
Presentation, Dept. of Physiology
East Carolina University, Greenville, NC

Probing Monoamine Transporters with Aminopropiophenones — **October 11,, 2000**
Presentation, Dept. of Physiology
East Carolina University, Greenville, NC

Teaching Skills for the Medical School Educator — **May 15, 2000**
Brody School of Medicine
East Carolina University, Greenville, NC

Mapping the Serotonin Reuptake Transporter — **July 16, 1999**
Presentation, Dept. of Medicinal Chemistry and Dept. of Pharmacology and Toxicology
Virginia Commonwealth University, Richmond, VA

Indan Analogues of Fenfluramine and Norfenfluramine Have Reduced Neurotoxic Potential — **March 17, 1999**
Presentation, Dept. of Pharmacology
East Carolina University, Greenville, NC

Mapping the Serotonin Reuptake Transporter — **March 8, 1999**
Presentation, Dept. of Biochemistry
East Carolina University, Greenville, NC

National Center of Leadership in Academic Medicine Personal Mentoring Program — **1999-2000**
Protégé, Brody School of Medicine
East Carolina University, Greenville, NC

Drugs of the Rainforest: A Pharmacological Sampler — **Octobeer 18, 1995**
Presentation, The Rainforest Pharmacy
Massachusetts College of Pharmacy, Boston, MA

Nerve Gases: Mechanisms of Toxicity, Physiological Effects, and Antidotes — **October 15, 1991**
Presentation, Pre-Medical Student Association
University of Wisconsin Medical School, Madison, WI

Drug Education at the College Level — **February 2-3, 1991**
Panel Member, The Bridge Conference
Stanford University, Palo Alto, CA

PATENTS

Filtration agents and methods of use thereof. US patent number: US 20120167903 A1

PROFESSIONAL AFFILIATIONS

American Chemical Society (Division of Medicinal Chemistry)

American Society for Pharmacology and Experimental Therapeutics (Division for Neuropharmacology)

Multidisciplinary Association for Psychedelic Studies

Society for Neuroscience (Division for Neuropharmacology and Neurochemistry)

EXHIBIT 2

Declaration of Prof. Gregory B. Dudley, Ph.D.

1. I am over the age of 21.

2. I have personal knowledge of the matters contained within this Affidavit and the associated Exhibit.

3. I am an independent scientific consultant specializing in organic chemistry and related fields.

4. I am a Professor and Associate Chair in the Department of Chemistry and Biochemistry at Florida State University.

5. I received a B.A. degree in chemistry from Florida State University in 1995 and a PhD in organic chemistry from Massachusetts Institute of Technology in 2000. I was a postdoctoral research fellow in the Molecular Pharmacology and Chemistry program at the Memorial Sloan-Kettering Cancer Center in New York from 2000 until 2002.

6. I am an organic chemist with professional expertise in synthetic chemistry, molecular pharmacology, medicinal chemistry, chemical structure, molecular interactions, and structure-activity relationships. My primary research focus is on the synthesis of drugs and drug-like compounds. I have published and lectured extensively in these areas, as reflected in my CV, which is attached and referenced in full as Exhibit 1.

7. I have reviewed the Presentence Investigation Report. According to the Presentence Investigation Report:

    a. Count 1 of the indictment is conspiracy to import XLR-11.
    b. Count 2 of the indictment is conspiracy to manufacture, possess with intent to manufacture and distribute XLR-11.
    c. XLR-11 is a Schedule I controlled substance used in the manufacture of Smokable Synthetic Cannabinoid (SSC) products.
    d. In a typical SSC formulation, one (1) unit of a synthetic cannabinoid is mixed with thirteen (13) units of a leafy "carrier" substance.
    e. Users of SSCs have reported effects similar to marijuana.
    f. Different synthetic cannabinoids are used in different SSC products.
    g. XLR-11 is one of hundreds of synthetic cannabinoids.

8. As it pertains to this case and within the field of chemistry and molecular pharmacology:

    a. A synthetic substance is one that is produced in a lab by chemical synthesis.
    b. A cannabinoid substance is one that binds with cannabinoid receptors.

c. A synthetic cannabinoid is a substance that is produced in a lab by chemical synthesis and that binds with cannabinoid receptors.

9. Based on the Presentence Investigation Report, one can reasonably conclude that XLR-11 and other synthetic cannabinoids were being imported with the intent of manufacturing and distributing SSC products designed to mimic the appearance, properties, and effects of marijuana.

   a. With respect to Count 1, the Presentence Investigation Report details how synthetic XLR-11 was being imported from overseas suppliers.
   b. With respect to Count 2, nothing in the Presentence Investigation Report indicates intent or capability to synthesize XLR-11 from simpler chemical building blocks by chemical synthesis.
   c. However, with respect to Count 2, the Presentence Investigation Report does detail how one might use XLR-11 and other synthetic cannabinoids to produce marijuana-like SSC products.

10. Based on the Presentence Investigation Report, one can reasonably conclude that SSC products derived from XLR-11 and other synthetic cannabinoids would be comparable to marijuana in their appearance, usage, and effects.

11. I have reviewed the 2012 United States Sentencing Commission Guidelines. According to the Sentencing Commission Guidelines:

> *"In the case of a controlled substance that is not specifically referenced in this guideline, determine the base offense level using the marihuana equivalency of the most closely related controlled substance referenced in this guideline. In determining the most closely related controlled substance, the court shall, to the extent practicable, consider the following:*
>
> a. *Whether the controlled substance not referenced in this guideline has a chemical structure that is substantially similar to a controlled substance referenced in this guideline.*
> b. *Whether the controlled substance not referenced in this guideline has a stimulant, depressant, or hallucinogenic effect on the central nervous system that is substantially similar to the stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance referenced in this guideline.*
> c. *Whether a lesser or greater quantity of the controlled substance not referenced in this guideline is needed to produce a substantially similar effect on the central nervous system as a controlled substance referenced in this guideline."*

12. Based on the Presentence Investigation Report, "*the most closely related controlled substance* [to XLR-11 and related synthetic cannabinoids used in the manufacture of SSCs that produce marijuana-like effects] *referenced in this guideline*" is marijuana.

a. With respect to paragraph (a) on chemical structure, XLR-11 is not "substantially similar" to any substance listed in the guideline.
b. With respect to paragraph (b) on pharmacological effects, XLR-11 can be described as a cannabinoid with marijuana-like effects.
c. With respect to paragraph (c) on the quantity needed to produce a given effect (i.e., potency), when formulated as an SSC as described in the Presentence Investigation Report, XLR-11 would be expected to have a potency similar to that of marijuana.

13. My analysis and opinions are true and accurate to the best of my knowledge and would be accepted by the scientific community.

Tallahassee, Florida
December 7, 2015

GBDudley

Prof. Gregory B. Dudley

Gregory B. Dudley, Ph.D.

Professor and Associate Chair	Office: 5007 CSL
Department of Chemistry and Biochemistry	Phone: (850) 644-2333
Florida State University	Fax: (850) 644-8281
Tallahassee, FL 32306–4390	Email: gdudley@chem.fsu.edu

Professional Appointments

Florida State University, Tallahassee, FL

- Associate Department Chair 2012--present
- Professor of Chemistry and Biochemistry 2015--present
- Associate Professor of Organic Chemistry 2008–2015
  Raymond Cottrell Family Professor 2008–2012
- Assistant Professor of Organic Chemistry 2002–2008
- http://www.chem.fsu.edu/dudley/index.html

University of Ottawa, Canada

- Visiting Professor of Organic Chemistry 2011

Education and Professional Development

Sloan-Kettering Institute for Cancer Research, New York, NY

- NIH Postdoctoral Fellow, 2000–2002
- Molecular Pharmacology and Chemistry Program
- *Advisor:* Professor Samuel J. Danishefsky
- Research Topic: *Total Synthesis of Guanacastepene A*

Massachusetts Institute of Technology, Cambridge, MA

- September 1995 to August 2000
- Ph.D. in Organic Chemistry
- *Research Advisor:* Professor Rick L. Danheiser
- Thesis: *A Total Synthesis of (--)-Ascochlorin*

Florida State University, Tallahassee, FL

- August 1991 to May 1995
- B.A. degree in Chemistry, with Honors - *magna cum laude*
- *Research Advisor:* Professor Martin A. Schwartz

University of Kansas, Lawrence, KS

- June 1994 to August 1994
- NSF Research Experience for Undergraduates Program
- *Research Advisor:* Professor Richard S. Givens

Honors and Awards

- *CEM Corporation* Lecturer, Georgia State University, 2015
- *Organic Syntheses* Lecturer, University of New Hampshire, 2012
- Raymond Cottrell Family Professor, 2008–2012
- Highlighted in Florida Trend Magazine, "Person to Watch", 2010
- FSU Developing Scholar Award, 2010
- FSU Undergraduate Teaching Award, 2010
- FSU Research Foundation GAP Award, 2008
- FSU Innovator Award, 2006, 2007, 2008, 2010, 2012
- Featured in Tallahassee Magazine, "The New Establishment", 2006
- Thieme Publishers Journal Award, 2006
- ORAU Ralph E. Powe Junior Faculty Enhancement Award, 2004
- Research Corporation Research Innovation Award, 2004
- FSU First-Year Assistant Professor Award, 2003
- NIH Postdoctoral Fellowship, 2000–2002
- Bristol-Myers Squibb Predoctoral Fellowship, 1999–2000
- Roche Award for Excellence in Organic Chemistry, 1999
- Boehringer Ingelheim Predoctoral Fellowship, 1997–1998
- MIT Chemistry Outreach Fellowship, 1997

Professional Activities

- Associate Chair: Department Curriculum, 2012–present
  Responsible for curriculum design, teaching assignments, instructor supervision, course creation and approval, and other duties.
- Conference Organizer: Enabling Technology for Reactions and Processes, 2015–present
  Initiated and help coordinate an annual workshop for synthetic and physical organic chemists on modern tools and methods for chemical synthesis. This workshop is part of the Telluride Science Research Center (TSRC) summer conference series in Telluride, CO.
- Professional Member of the AAAS, 2014–present
  American Association for the Advancement of Science
- Member of the American Chemical Society (ACS), 1996–present
- Faculty Advisor: FSU Chemistry Outreach, 2004–2013
  Initiated and currently serve as faculty mentor for a program in which graduate students visit area high schools, interact with students in the chemistry classes, and perform demonstrations
- Faculty Advisor: Alpha Phi Omega, 2007–2013
  Serve as faculty advisor and mentor for the FSU chapter of Alpha Phi Omega (AΦΩ), the national undergraduate service fraternity
- Faculty Advisor: FSU BioDiesel Initiative, 2008–2010
  Served as faculty advisor and mentor for a group of undergraduate students as they built a reactor for converting used fry grease into usable biodiesel fuel for campus vehicles
- Faculty Advisor: ChemPreneurs pilot program, 2009
  Led a ChemPreneur team, comprising a chemistry graduate student and a business school entrepreneur student, in the development of a business plan based on chemical technology

Classroom Teaching

- Instructor: General Chemistry I, CHM 1045C
  Course Description: introductory chemistry course for science majors (2004–2005, 2007)
- Instructor: Survey of Organic Chemistry, CHM 2200
  Course Description: one-semester organic chemistry for allied health majors (2011–2013)
- Instructor: Organic Chemistry I, CHM 2210
  Course Description: introductory undergraduate organic chemistry course (2010, 2015x2)
- Instructor: Organic Chemistry II, CHM 2211
  Course Description: second-semester undergraduate organic chemistry course (2009)
- Instructor: Honors Organic Chemistry I, CHM 2210
  Course Description: undergraduate organic chemistry course for honors students (2007–2008)
- Instructor: Honors Organic Chemistry II, CHM 2211
  Course Description: undergraduate organic chemistry course for honors students (2008–2009)
- Instructor: Advanced Organic Chemistry — Reactions, CHM 5226
  Course Description: graduate course on important organic methodology (2002–2006, 2011)
- Instructor: Synthetic Organic Chemistry, CHM 5250
  Course Description: graduate course on organic reactions and synthesis (2014x2)
- Instructor: Chemical Reactivity — Bioorthogonal Chemistry, CHM 5555
  Course Description: graduate course on a cutting-edge topic in the chemical sciences (2012)
- Instructor: Advanced Topics in Organic Chemistry: Alkynes, CHM 8304J (2011)
  Course Description: graduate course on modern alkyne chemistry (Univ of Ottawa, 2011)

Research Associates

Graduate Students

Paratchata Batsomboon	6th year student	Chulabhorn Research Institute, Thailand
Ron R. Ramsubhag	5th year student	University of Connecticut
Alec E. Morrison	4th year student	Worcester Polytechnic Institute, MA
Nicholas M. Kramer	3rd year student	Ramapo College of New Jersey
Joshua Gagnier	3rd year student	East Carolina University
Gregory Kostelac	1st year student	University of West Florida
Suzan Al-Anwar	visiting student	Lebanese University, Beirut

Undergraduate Students

Andrew Janeczek	08/2015 – present
Danielle Fox	01/2015 – present
Chelsea Massaro	01/2014 – present
Christina Dadich	08/2014 – present

Previous Group Members

Former postdoctoral associates:
Prof. Gaspar Diaz Muñoz, 01/2012–01/2013
Dr. Jumreang Tummatorn, 12/2009–06/2011
Dr. Philip A. Albiniak, 08/2006 – 02/2009
Dr. Jeannie H. Jeong, 08/2007 – 12/2008
Dr. Sreenivas Katukojvala, 08/2005–07/2006
Dr. Kevin Wing C. Poon, 01/2004 – 06/2006
Dr. Shin Kamijo, 01/2004 – 03/2006
Dr. Timothy F. Briggs, 10/2003 – 10/2005
Dr. Hubert T.-C. Lam, 01/2003 – 09/2005

Former graduate students:
Tung Hoang, Ph.D. 2015
Rimantas Slegeris, Ph.D. 2015
Michael R. Rosana, Ph.D. 2014

Marilda P. Lisboa, Ph.D. 2013
Jingyue Yang, Ph.D. 2011
Sami F. Tlais, Ph.D. 2011
David M. Jones, Ph.D. 2009
Douglas A. Engel, Ph.D. 2009
Mariya V. Kozytska, Ph.D. 2008
Susana S. Lopez, M.S. 2009
Daniella M. Barker, M.S. 2009
Dena R. Hodges, M.S. 2008
Ernest O. Nwoye, M.S. 2008
Samuel G. Salamone, M.S. 2005

Selected former undergraduate students:
Apiwat Wangweerawong, B.S. Honors 2011
Cecelia C. O'Leary, B.S. Honors 2010
Sarah E. House, B.S. Honors 2005
James D. Sunderhaus, B.S. Honors 2003
Taylor Southworth, B.S. 2013
Colleen Keohane, B.S. 2013
Rojay Gordon, B.S. 2013
Janet Simon, B.S. 2012
Claudia R. Avalos, B.S. 2010
Shawn M. Amisial, B.S. 2007
Jeananne A. Singletary, B.S. 2004

CHM 1051L (honors freshmen) students:
Margaret E. Matthews (2007), Joseph P. Hernandez (2007), Alyson W. West (2008), Edward F. Kuester (2008), James Hoang (2013), Jillian Jones (2013)

Visiting and exchange students:
Andrew Royappa (2013), Vitchaphol "Ton" Motaneeyachart (2012), Sanpitcha "Jae" Siangsuebchart (2012), Cristiano Leandro (2012), Teng-wei Wang (2011), Tanit Intaranukulkit (2011), Thitiya "Whan" Patarakosol (2009), Viriya "Joy" Boonmuang (2009), Jumreang Tummatorn (2007 – 2008), Maureen K. Reilly (2006)

Student Dissertations and Theses (with type and title)

Tung Hoang (PhD, 2015) *"Tandem processes involving an alkynogenic fragmentation and applications in sesquiterpene syntheses"*

Rimantas Slegeris (PhD, 2015) *"Process improvements in the total chemical synthesis of progesterone, and other synthetic studies"*

Michael R. Rosana (PhD, 2014) *"Selective heating of polar solutes in a homogeneous solution: evidence of microwave-specific effects and a method to quantify these effects"*

Marilda P. Lisboa (PhD, 2013) *"Formal synthesis of palmerolide A using fragmentation methodology"*

Jingyue Yang (PhD, 2011) *"Anionic rearrangement of 2-benzyloxypyridine derivatives and a synthetic approach to aldingenin B"*

Sami F. Tlais (PhD, 2011) *"I. para-Siletanylbenzyl (PSB) protecting group II. Stereocontrol of 5,5-spiroketals in the synthesis of cephalosporolides H, E, and F"*

David M. Jones (PhD, 2009) *"Addition / C–C bond cleavage reactions of vinylogous acyl triflates and their application to natural products synthesis"*

Douglas A. Engel (PhD, 2009) *"Organic synthesis and methodology related to the malaria drug artemisinin"*

Mariya V. Kozytska (PhD, 2008) *"I. Siletanylmethyllithium, an ambiphilic siletane. II. Synthetic approach to basiliolide B"*

Susana S. Lopez (MS, 2009) *"Methodology for the olefination of aldehydes and ketones via the Meyer-Schuster reaction"*

Samuel G. Salamone (MS, 2005) *"A ring expansion approach to roseophilin"*

Apiwat Wangweerawong (BS, Honors 2011) *"Scope of a novel [1,2]-anionic rearrangement of 2-benzyloxypyridine derivatives"*

Cecelia C. O'Leary (BS, Honors 2010) *"A novel protocol for the synthesis of aryl Grignard reagents at low heat"*

Sarah E. House (BS, Honors 2005) *"para-Siletanylbenzyl: a novel hydroxyl protecting group"*

Publications

Dudley Lab Original Research Publications:

(63) Ferrari, A.; Hunt. J.; Stiegman, A. E.; Dudley, G. B. Microwave-assisted superheating and/or microwave-specific superboiling (nucleation-limited boiling) of liquids occurs under certain conditions but is mitigated by stirring. *Molecules* **2015**, 20, 21671–21680.
(Invited Contribution to a Special Issue on Microwave-Assisted Organic Synthesis)
http://www.mdpi.com/1420-3049/20/12/19793

(62) Diaz Muñoz, G.; Dudley, G. B. Synthesis of 1,2,3,4-tetrahydroquinolines including angustureine and congeneric alkaloids. *Org. Prep. Proc. Intl.* **2015**, *47*, 179–206.
http://dx.doi.org/10.1080/00304948.2015.1025012

(61) Dudley, G. B.; Richert, R.; Stiegman, A. E. On the Existence of and Mechanism for Microwave-Specific Reaction Rate Enhancement. *Chem. Sci.* **2015**, *6*, 2144–2152.
http://pubs.rsc.org/en/content/articlelanding/2015/sc/C4SC03372H

(60) Rizkallah, R.; Batsomboon, P.; Dudley, G. B.; Hurt, M. The Oncogenic Kinase TOPK/PBK is a Master Mitotic Regulator of C2H2 Zinc Finger Proteins. *Oncotarget* **2015**, *6*, 1446–1461.
http://www.impactjournals.com/oncotarget/index.php?journal=oncotarget&page=article&op=view&path[]=2735
FSU Press Releases:
"*Researchers collaborate to identify 'master regulator' in cell division*"
http://medicalxpress.com/news/2015-03-collaborate-master-cell-division.html
"*Working together to unmask 'Enzyme X'*"
http://issuu.com/fsumed/docs/fsu_med_spring_2015_final/7?e=0

(59) Chen, P.-K.; Rosana, M. R.; Dudley, G. B.; Stiegman, A. E. Parameters affecting the microwave-specific acceleration of a chemical reaction. *J. Org. Chem.* **2014**, *79*, 7425–7436.
http://pubs.acs.org/doi/abs/10.1021/jo5011526
Featured in *Chemical and Engineering News* **2014**, *92*(32), 23.
http://cen.acs.org/articles/92/i32/Microwaves.html
Featured in *Chemistry World*:
http://www.rsc.org/chemistryworld/2014/09/debate-over-microwave-specific-heating-rumbles

(58) Rosana, M. R.; Hunt, J.; Ferrari, A.; Southworth, T.; Tao, Y.; Stiegman, A. E.; Dudley, G. B. Microwave-Specific Acceleration of a Friedel–Crafts Reaction: Evidence for Selective Heating in Homogeneous Solution. *J. Org. Chem.* **2014**, *79*, 7437–7450.
http://pubs.acs.org/doi/abs/10.1021/jo501153r
Featured in *Chemical and Engineering News* **2014**, *92*(32), 23.
http://cen.acs.org/articles/92/i32/Microwaves.html
Featured in *Chemistry World*:
http://www.rsc.org/chemistryworld/2014/09/debate-over-microwave-specific-heating-rumbles
GEOSET <http://www.geoset.info/> video presentations on selective microwave heating: http://goo.gl/jVhVSC, http://goo.gl/nbECVu, http://goo.gl/o3qN3U, http://goo.gl/OdXeY0

(57) Gold, B. A.; Batsomboon, P.; Dudley, G. B.; Alabugin, I. V. Alkynyl crown ethers as a scaffold for hyperconjugative assistance in non-catalyzed azide-alkyne click reactions: ion sensing through enhanced transition state stabilization. *J. Org. Chem.* **2014**, *79*, 6221–6232.
http://pubs.acs.org/doi/abs/10.1021/jo500958n

(56) Lisboa, M. P.; Dudley, G. B. Synthesis of cytotoxic palmerolides. *Chem.–Eur. J.* **2013**, *19*, 16146–16168.
http://onlinelibrary.wiley.com/doi/10.1002/chem.201302167/abstract

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Research Presentations

upcoming

- 57th Groupement d'Etude de Chimie Organique (GECO), Basque Region, France
- TSRC Enabling Technology for Reactions and Processes Conference, Telluride, CO
- Rensselaer Polytechnic Institute, Troy, NY
- Mona Symposium, Kingston, Jamaica

2015

145. TSRC Enabling Technology for Reactions and Processes Conference, Telluride, CO
144. ACS Florida Meeting, Tampa (*chem ed*)
143. ACS Florida Meeting, Tampa (*organic*)
142. Georgia State University, Atlanta
141. University of California, San Francisco
140. Rigel Pharmaceuticals, San Francisco
139. Auburn University, AL
138. Rutgers University, Piscataway, NJ

2014

137. University of Kansas, Lawrence
136. North Carolina Federal Defenders, Raleigh, NC
135. CEM Corporation, Matthews, NC
134. University of North Carolina, Greensboro
133. Wake Forest University, Winston-Salem, NC
132. University of California, Merced
131. Utah State University, Logan
130. Brigham Young University, Provo, UT
129. Cubist Pharmaceuticals, Lexington, MA
128. Ensemble Pharmaceuticals, Cambridge, MA
127. TSRC Accelerating Reaction Discovery Conference, Telluride, CO
126. Natural Products Gordon Conference
125. Organic Reactions Gordon Conference
124. National Federal Defenders Convention, Cleveland, OH
123. Florida Heterocyclic Conference, Gainesville
122. Florida State University, Tallahassee

2013

121. Lebanese University, Beirut
120. University of New Mexico, Albuquerque
119. New Mexico State University, Las Cruces
118. University of South Alabama, Mobile
117. University of West Florida, Pensacola

2012

116. Max Plank Institute, Potsdam, Germany
115. University of Hannover, Germany
114. Technical University, Dortmund, Germany
113. Louisiana State University, Baton Rouge
112. Notre Dame University, South Bend, IN
111. University of Chicago, IL
110. University of Illinois, Chicago
109. University of New Hampshire, Durham
108. Dartmouth College, Hanover, NH
107. University of the South, Sewance, TN
106. University of Tennessee, Knoxville
105. Middle Tenn State Univ, Murfreesboro, TN
104. ACS National Meeting, Philadelphia, PA
103. ACS National Meeting, Philadelphia, PA
102. ACS Florida Meeting, Tampa
101. Organic Faculty of Florida Conference
100. FAMU-FSU Engineering, Tallahassee
99. FSU Biomedical Sciences Symposinm

2011

98. University of Virginia, Charlottesville
97. Univ of Mary Washington, Fredericksburg, VA
96. ACS Southeast Meeting, Richmond, VA
95. NanoFlorida Conference, Miami, FL
94. University of Houston, TX
93. University of Texas, San Antonio
92. University of Minnesota, Twin Cities
91. University of Minnesota, Duluth
90. North Dakota State University, Fargo
89. NSERC-CREATE Program, Ottawa, Canada
88. University of Ottawa, Canada
87. Florida Heterocyclic Conference, Gainesville

2010

86. Federal University of Ouro Preto, Brazil
85. Federal University of Minas Gerais, Brazil
84. Federal University of Fluminense, Brazil
83. Federal University of Rio de Janeiro, Brazil
82. UNICAMP, Campinas, Brazil
81. University of Sao Paulo, Brazil
80. Sunrise Rotary Club, Tallahassee, FL
79. Tallahassee Economic Develop. Council, FL

2009

78. University of Toledo, Ohio
77. Wayne State University, Detroit, MI
76. University of California, Berkeley
75. Rigel Pharmaceuticals, San Francisco, CA
74. FSU College of Medicine, Tallahassee
73. Univ of Southern Mississippi, Hattiesburg
72. University of South Florida, Tampa
71. Natural Products Gordon Conference
70. Innovation Park, Tallahassee, FL
69. University of Oregon, Eugene
68. Oregon State University, Corvallis
67. Berry College, Mt Berry, GA

2008

66. BioFine Chemical Process Design Conference, Sanibel Island, FL
65. ACS Southeast Meeting, Nashville, TN
64. University of Vermont, Burlington
63. Schering–Plough Research, Cambridge, MA
62. Nanyang Technical University, Singapore
61. A*Star Institute of Chemical and Engineering Sciences, Singapore
60. National University of Singapore
59. Chulabhorn Research Institute, Thailand
58. Chulalongkorn Univ, Bangkok, Thailand
57. Schering–Plough Research, Kenilworth, NJ
56. ACS Florida Meeting, Orlando
55. U of British Columbia, Vancouver, Canada
54. Simon Fraser University, Burnaby, Canada
53. University of Washington, Seattle
52. Organic Faculty of Florida Conference
51. Texas Christian University, Fort Worth
50. University of Texas, Arlington
49. U of Texas Southwestern Med Center, Dallas

2007

48. Florida State University, Tallahassee
47. International Conference on the Chemistry of Antibiotics (ICCA-X), Nashville, TN
46. ACS Florida Meeting, Orlando
45. University of Wisconsin, Milwaukee
44. Marquette University, Milwaukee, WI
43. ACS National Meeting, Chicago, IL
42. University of Pennsylvania, Philadelphia
41. University of California, Santa Barbara
40. University of California, San Diego
39. Emory University, Atlanta, GA
38. Tennessee State University, Nashville

2006

37. University of Arkansas, Fayetteville
36. University of Delaware, Wilmington
35. Temple University, Philadelphia, PA
34. ACS Southeast Meeting, Augusta, GA
33. East Carolina Univ, Greenville, NC
32. ACS National Meeting, San Francisco, CA
31. Organic Reactions Gordon Conference
30. Eli Lilly Pharmaceuticals, Indianapolis, IN
29. ACS Florida Meeting, Orlando
27. Organic Faculty of Florida Conference
27. Univ of North Florida, Jacksonville
26. Vanderbilt University, Nashville, TN
25. Austin Peay State Univ, Clarksville, TN
24. Merck Research, Rahway, NJ
23. Univ of North Carolina, Chapel Hill
22. GlaxoSmithKline, RTP, NC
21. Duke University, Durham, NC

2005

20. Univ of Massachusetts, Amherst
19. Smith College, Northampton, MA
18. University of Connecticut, Storrs
17. University of Houston, TX
16. University of Florida, Gainesville
15. University of Georgia, Athens
14. Gulf Coast Chemistry Conference
13. Natural Products Gordon Conference
12. University of Alabama, Tuscaloosa
11. University of West Florida, Pensacola

2004

10. Rutgers University, New Brunswick, NJ
9. Barry University, Miami, FL
8. Southern University, Baton Rouge, LA
7. Kenesaw State University, Kenesaw, GA
6. ACS Florida Meeting, Orlando
5. Organic Faculty of Florida Conference

2003

4. Florida Institute of Technology
3. College of Charleston, SC
2. Florida International University, Miami
1. University of Miami, FL

Financial Support

Current Funding

- 09/2013–08/2016 *Synthesis of high-value alkynes*
  Source: National Science Foundation
  Award (Amount): NSF-CHE 1300722 ($450,000 total; $336,615 direct)
  Role: PI (80%); co-PI: Igor Alabugin (20%)

Pending Funding

- 09/2016–08/2019 *Selective dielectric heating of multicomponent solutions*
  Source: National Science Foundation
  Award (Amount): NSF-CHE 1566208 ($560,000 total; $398,077 direct)
  Role: PI (50%); co-PI: Al Stiegman (50%)

Prior Funding

- 07/2011–08/2013 *New fragmentation reactions and strategies for chemical synthesis*
  Source: FSU Research Foundation
  Award (Amount): FSU-BRIDGE ($84,814)
  Role: PI
- 07/2008–06/2011 *New fragmentation reactions and strategies for chemical synthesis*
  Source: National Science Foundation
  Award (Amount): NSF-CHE 0749918 ($378,000 total; $272,677 direct)
  Role: PI
- 05/2011–08/2011 *Microwave-actuated organic reagents*
  Source: FSU Committee on Faculty Research Support (COFRS)
  Award (Amount): Faculty Summer Awards ($14,000)
  Role: PI
- 04/2010–03/2011 *Developing scholar award*
  Source: FSU Council on Research Creativity (CRC)
  Award (Amount): Developing Scholars 2010 Award ($10,000)
  Role: PI
- 01/2008–12/2008 *Organic Reagents for Current and Future Markets*
  Source: FSU Research Foundation
  Award (Amount): GAP award ($46,400)
  Role: PI
- 07/2005–06/2008 *Organic Synthesis and Methodology for Roseophilin, A Pharmacologically Active Natural Product*
  Source: James and Ester King Biomedical Research Program, Florida Department of Health
  Award (Amount): FBRP-DOH, 016272 ($450,000 total; $429,618 direct)
  Role: PI
- 01/2004–12/2007 *Ring Expansion Strategies for Preparing Cyclophanes: Concise Syntheses of Roseophilin and Floresolide A*
  Source: Research Corporation
  Award (Amount): Research Innovation Award, RI1161 ($35,000)
  Role: PI
- 06/2005–08/2007 *An Allene-Centered Pericyclic Reaction Sequence for the Synthesis of the Cyathane Diterpenes*
  Source: American Chemical Society, Petroleum Research Fund
  Award (Amount): PRF Type G, 42180-G1 ($35,000)
  Role: PI

- 05/2004 *Synthesis of Cytotoxic Cyclophanes: Haouamine A*
  Source: Oak Ridge Associated Universities
  Award (Amount): Ralph E. Powe Junior Faculty Enhancement Award ($10,000)
  Role: PI
- 05/2003–08/2003 *New Reagents for Organic Synthesis: Strained Silacycles*
  Source: FSU Council for Research and Creativity (CRC)
  Award (Amount): First Year Assistant Professor Award ($12,000)
  Role: PI

Expert Witness and Legal Consulting

Representative Reports:

- *Brief Of Expert Forensic Scientists As Amici Curiae In Support Of Petitioner Stephen McFadden* (Stephen Dominick McFadden v. United States of America)
  - Amicus Brief to the Supreme Court of the United States
  - Counsel of Record: Prof. Gerald M. Finkel, Charleston School of Law
- *Sentencing guideline considerations for methylone*
- *Sentencing guideline considerations for ethylone*
- *Structural analysis of PB-22 as a possible analogue of JWH-018*
- *The chemical structure of AB-Pinaca and its status as a possible controlled substance analogue of ADB-Pinaca*
- *Comparative analysis of JWH-018, UR-144, and XLR-11 (5F-UR-144)*
- *Past and present applications of the Analogue statute*
- *Scientific considerations relevant to the Analogue statute*

Expert Testimony:

12. State of Florida 15th Judicial Circuit, Palm Beach County, 2015-11-05
    Criminal trial by jury
    Expert testimony in the areas of forensic chemistry and drug science
    Provided expert testimony and opinion on substances alleged to be synthetic marijuana, and on the forensic detection and analysis of the controlled substance PB-22.
11. United States Federal Court, Southern District of Florida, Miami, 2015-10-23
    Sentencing hearing for a criminal proceeding
    Proffered and qualified as an expert in chemistry and pharmacology
    Provided expert testimony and opinion on the chemical structure, pharmacological effects, and potency of the controlled substance, methylenedioxyethcathinone (MDEC, ethylone)
10. United States Federal Court, District of New Mexico, Albuquerque, 2015-07-07
    Daubert hearing for expert witnesses in a criminal proceeding
    Proffered and qualified as an expert in chemistry
    Provided expert testimony and opinion on the chemical structure and pharmacological effects of synthetic cannabinoid substances including AM-2201, AM-694, JWH-250, UR-144, and XLR-11, which were alleged to be Controlled Substance Analogues of JWH-018
9. United States Federal Court, Middle District of Florida, Tampa, 2015-05-05
    Sentencing hearing for a criminal proceeding
    Qualified as an expert in chemistry; testified on chemistry and pharmacology
    Provided expert testimony and opinion on the chemical structure, pharmacological effects, and potency of the controlled substance, methylenedioxyethcathinone (MDEC, ethylone)
8. United States Federal Court, Middle District of Florida, Ft. Myers, 2015-04-28
    Sentencing hearing for a criminal proceeding
    Proffered and qualified as an expert in chemistry and pharmacology
    Provided expert testimony and opinion on the chemical structure, pharmacological effects, and potency of the controlled substance, methylenedioxyethcathinone (MDEC, ethylone)
7. United States Federal Court, Middle District of Florida, Tampa, 2015-01-27
    Sentencing hearing for a criminal proceeding

Proffered and qualified as an expert in chemistry and pharmacology

Provided expert testimony and opinion on the chemical structure, pharmacological effects, and potency of the controlled substance, methylenedioxyethcathinone (MDEC, ethylone)

6. United States Federal Court, District of Nevada, Las Vegas, 2014-12-03

Sentencing hearing for a criminal proceeding

Proffered and qualified as an expert in chemistry (telephonic testimony)

Provided expert testimony and opinion on the chemical structure of the controlled substance, methylenedioxymethcathinone (MDMC, methylone)

5. United States Federal Court, Middle District of Florida, Tampa, 2014-11-18

Sentencing hearing for a criminal proceeding

Proffered and qualified as an expert in chemistry

Provided expert testimony and opinion on the chemical structure of the controlled substance, methylenedioxymethcathinone (MDMC, methylone)

4. United States Federal Court, Eastern District of New York, Brooklyn, 2014-08-20

Sentencing hearing for a criminal proceeding

Proffered and qualified as an expert in chemistry (telephonic testimony)

Provided expert testimony and opinion on the chemical structure of the controlled substance, methylenedioxymethcathinone (MDMC, methylone)

3. United States Federal Court, District of Minnesota, Minneapolis, 2013-09-30

Criminal trial by jury

Testified as an expert in chemistry and pharmacology

Provided expert testimony and opinion on the chemical structure and pharmacological effects of synthetic cannabinoid substances including AM-2201, UR-144, and XLR-11, which were alleged to be Controlled Substance Analogues of JWH-018

2. State of Louisiana 22nd Judicial District Court, Parish of St Tammany, 2013-02-06

Hearing on a motion to quash a criminal indictment

Proffered and qualified as an expert in chemistry and pharmacology

Provided expert testimony and opinion on the chemical structure and pharmacological effects of synthetic cannabinoid substances of UR-144 and XLR-11, which were alleged to be Controlled Substance Analogues of JWH-018

1. United States Federal Court, Eastern District of Wisconsin, Milwaukee, 2013-02-28

Hearing on a petition for return of property

Proffered and qualified as an expert in chemistry and pharmacology

Provided expert testimony and opinion on the chemical structure and pharmacological effects of UR-144 and XLR-11, alleged to be Controlled Substance Analogues of JWH-018

0. United States Federal Court, Middle District of Florida, Orlando, 2012-12-06

Hearing on a motion to dismiss a criminal indictment and a petition for return of property

Attended the hearing and wrote a brief on scientific considerations for the Court

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF FLORIDA
CASE NO. 15-14034-CR-MIDDLEBROOKS

UNITED STATES OF AMERICA,

Plaintiff, DECEMBER 11, 2015

vs.

SAIFUL HOSSAIN, AHMED YEHIA KHALIFA,
AHMED MAHER ELHELW,

Defendants.
_____/ PAGES 1 - 245

TRANSCRIPT OF SENTENCING HEARING
BEFORE THE HONORABLE DONALD M. MIDDLEBROOKS
UNITED STATES DISTRICT JUDGE

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P-R-O-C-E-E-D-I-N-G-S

THE COURT: Okay. Is everybody settled?

This is sentencing in the case of Ahmed Khalifa, Saiful Hossain, and Ahmed Elhelw. I'm sure I massacred those pronunciations, I apologize.

Could we please have appearances.

MS. LINEBERGER: Good afternoon, Your Honor. Carmen Lineberger on behalf of the United States.

THE COURT: Good morning.

MS. LINEBERGER: Good morning, sir.

MR. SCHELLER: Good morning, Your Honor. Fritz Scheller, I'm here on behalf of Saiful Hossain.

THE COURT: Good morning.

MR. LUBIN: Good morning, Your Honor. Richard Lubin, also on behalf of Mr. Hossain, along with Fritz Scheller.

THE COURT: Good afternoon.

MR. SHINER: Good morning, Your Honor. Marc Shiner on behalf of Ahmed Elhelw.

THE COURT: Good morning.

MR. O'BRIEN: May it please the Court, my name is Mark O'Brien and seated to my right -- or my left is Ahmed Khalifa.

THE COURT: Okay. First, there is the report and recommendation from the magistrates as to the change of plea for each of the Defendants. Is there any issue as to that?

MR. LUBIN: None, Your Honor, as to Mr. Hossain.

MR. SHINER: None on behalf of Mr. Elhelw.

MR. O'BRIEN: None as to Mr. Khalifa.

THE COURT: I will adopt the report and recommendations and adjudge the Defendants guilty of the crime charged.

I have read all of the written materials that you all have provided to me. It is pretty lengthy, and I have actually started looking at other things as well, trying to understand this.

It looks to me like this presents some fairly novel issues in sentencing: A different drug, the science seems to be in its infancy; the guideline issues, there is not a clear guideline, we will need to figure out the guideline which is applicable.

There seems to be some issues as to drug amount. I know there may be some role issues, so the guideline issues are of some significance and depending on how the guidelines come out, particularly the issue of how I deal with the ratio of drugs.

It doesn't seem like marijuana necessarily fits, but I'm not convinced that the ratio is appropriate, this 1 to 167. Depending on how we come out on guideline issues, the variance issues come into play.

I don't think a 324 month sentence is reasonable from

what I have seen, so I think those issues will have to be dealt with.

It seems to me this drug is different than marijuana and may be more dangerous. There are some deterrence issues that need to be involved, but also it seems like, in some respects, this drug may be closer to marijuana than cocaine or heroin in terms of the accompaniment -- or often accompaniment of violence and the health issues, while significant, may be different.

So I -- and I see that there has been some -- I read the transcript of Judge Moore's hearing. Ms. Lineberger sent me an order from a judge in New York, but it is pretty brief, as to some of these issues. She cites some other cases around the country.

So anyway, I guess this is a long way of saying what I would like to do is hear -- I think you all have some witnesses, understand the science better on my end, I want to understand the drug calculations in terms of amounts.

If we can get -- I want to deal with the guideline issues initially, and that may take the day. I don't think I can proceed all the way to sentencing today.

So what I want to do is hear as much of that evidence that you all want to present, and then I want to make -- I'm going to write a sentencing memorandum as part of this, so I think we need -- and then I would ask the lawyers to talk among

themselves. I could do this next Thursday or Friday, too. We have today and see if either Thursday or Friday work for you all. I could do it Wednesday, but I'm more limited to time to come back and try to finish and might invite you all to provide some additional materials on some of the issues I mentioned that might come up today, rather than try to rush to sentencing today. So those are my thoughts.

Ms. Lineberger, I see you standing up.

MS. LINEBERGER: Yes, but I don't want to interrupt the Court.

THE COURT: Go ahead.

MS. LINEBERGER: Your Honor, I have spoken with Counsel for Mr. Elhelw; I have spoken with Counsel for Mr. Khalifa, and they don't have -- and I don't want to speak for them, but it appears that they don't have any objections to the presentence report. But their sentences would depend on the amount of drugs involved because Hossain is contesting it, at least Mr. Khalifa's would. But Mr. Elhelw's ultimate sentence would depend on his 3553 factors, as well as the Court's ultimate decision on the ratio.

With regard to Mr. Hossain, he is contesting things in the presentence report, and that contest would be the amount of drugs involved, his role as a leader, which would require me to call a law enforcement officer to testify, and then he is contesting the ratio.

Now, I believe we have all flew in people to Florida, to a warmer climate, for the testimony with regard to the ratio. If I may consult with Counsel, as the Court has suggested, and my witnesses, perhaps we may be able to, because my law enforcement officer is in the State of Florida, about an hour away, perhaps that would be the portion Your Honor might want to postpone.

THE COURT: I would like to get any witness that is here today, particularly on this science and drug amount.

The role, if you could get to it today, that would be great; if you can't, we will do that next time. But I'm more interested in trying to understand the drugs, drug ratios, and any health studies that you might want to put on. To the degree you have witnesses to deal with that, I would like to hear that today.

You can organize your presentation however you want; but I would think that the ratio and drug amounts -- I don't understand how you are calculating drug amounts, whether you are counting the herbs as well as the chemical, or just the chemical. I can't tell from the PSI quite how you are calculating that.

You also are doing it based on some e-mails or something, as I understand it.

MS. LINEBERGER: Your Honor, not to interrupt the Court, but to answer that issue, Your Honor, it's the

Government's position that the Court could reasonably calculate, from the evidence and based on e-mails, which would be pure powder product as it came from China; or the Court could calculate it based on the total amount seized by law enforcement in this case, which would include pure product, as it came in boxes from China intercepted, plus product seized in the search warrant.

And it is the Government's position that they come to the same range as far as Mr. Khalifa and Mr. Hossain are concerned. The Government believes and it is not contested by Mr. Elhelw.

Mr. Elhelw -- and correct me if I'm wrong, Counselor -- is satisfied with the Government's calculation as to him, and that would be pure product and the amount set forth.

THE COURT: So by pure product, you mean before it is put on any kind of herbs? Isn't it sprayed on some sort of herbs or grass material before being sold?

MS. LINEBERGER: Yes. Vegetable matter, yes, is laced with the product, and my expert is prepared to discuss that.

If the Court pleases, with regard to the law enforcement officer's testimony as to actual amount, may we see you at sidebar?

THE COURT: No. I don't want to do it, I don't think

it is necessary to do something at sidebar. If you all can reach an agreement, that's fine, but sentencings are public.

MS. LINEBERGER: Yes, Your Honor.

THE COURT: I don't see a need for a sidebar.

MS. LINEBERGER: May I talk with the witnesses and then Counsel about how we will split this?

THE COURT: Sure.

MS. LINEBERGER: Thanks.

(Break in the proceedings.)

MR. LUBIN: May I address the Court?

THE COURT: Sure.

MR. LUBIN: Your Honor, for today, on the ratio issue, there are three experts, and possibly a fourth. One of ours has to be at the airport at 4:00, one of our experts. The other one, it's not an issue.

What I think we would suggest is that since the burden is on the Government, that maybe they would put their expert on; an hour on direct, a little bit on cross, and then we could put on our next expert, who has to be at the airport at 4:00, and then see where we are.

We have another one here, if we can get him done today, which I think we probably can, and then maybe we can knock off that whole side of things. Now, the Government may decide they need someone else later on, but we will worry about that.

In terms of the continuation of the hearing, we have got -- I think we have insurmountable problems for next week. Both Mr. Scheller and I are out of town on a case -- two cases, one for me and one that we are on together, and another one that you have next week. And then I was going to take a week off, head out a town for the week between Christmas and New Year's, and so I believe that we would have to request that you would put phase two in January.

THE COURT: I don't really want to do that. I mean, if I have to -- Monday and Wednesday are unavailable to you also, but Thursday and Friday work the best in terms of time for us. I have to be in Miami all day Tuesday.

I could do it Monday, although I would rather have a chance to digest whatever you all give us today.

MR. LUBIN: So would we.

THE COURT: But Monday is a possibility for us. Wednesday, I could do it, but only until 3:00 o'clock. And Thursday and Friday, I'm pretty -- I would have thought we could get pretty far today.

I don't understand why -- you have three experts in your papers, I have read their materials. I don't understand why it takes a day -- more than a day to get rid of all of the -- not get rid of, but to hear from these scientists.

MR. LUBIN: Well, I just do want to say, the impact of this is enormous, and so we want to make sure that we can

fully present what we want to present, not only enormous for the Defendants here, but I think --

THE COURT: Well, going into it, you thought you were going to do it all today, didn't you?

MR. LUBIN: No. We respectfully said we didn't think we could do it all in a day, and that was one of the reasons we asked for a continuance for today. We had said we thought it would make more than a day.

But I think we can get these experts done today, I do, especially if we get going on them and then worry about the next day at some other point. But I don't believe there is any way we can get this done next week with our schedules, and I don't even know about the schedules for the other gentlemen at the table. But in terms of Mr. Hossain and his lawyers, it is just impossible really, I think, to do it next week.

MR. SCHELLER: If I may, Fritz Scheller on behalf of Mr. Hossain.

Your Honor, there is also, I think, a continuance in this case, and I know the Court is reluctant, but maybe doing the second phase in January may be ideal because I think there might be some supplemental authority or briefings that may be required. This Court may require additional information to decide this 1 to 167 ratio issue.

In addition, I did have a conversation with the Government, and I think we may be able to resolve some of the

issues as to role and weight, so we may not need to have a lengthy hearing on that. I think we do want to have an opportunity to meet and discuss that.

Again, I think this Court pointed out, this is an important issue. The science is very limited on it, and the effect for my client is 20 years in the guidelines. The difference, if it is treated as THC and marijuana, it comes out to a 20 year difference in his sentence.

THE COURT: I think he probably ends up somewhere in-between, is my guess.

MR. SCHELLER: I'm sorry?

THE COURT: I think he ends up somewhere in-between. It is hard for me to see how this should be viewed similarly or the same as marijuana.

I'm not convinced that the Government's ratios and all of that is correct, but I don't -- it seems to me that it appears that problems associated with this drug are more than marijuana, from what I read of what you all have given me in terms of --

MR. SCHELLER: That's going to be an issue that's developed. We received the materials yesterday from the Government that they filed, and that's something we are going to address, too.

There are certain limitations to those studies regarding the effects of XLR-11, so I think that is actually

going to actually prolong the presentation today.

And respectfully -- and I respect the Court's time -- I just think realistically, doing the experts today will take the whole day, but I would ask that we have the hearing sometime in January.

THE COURT: Let's see if we can get started. I mean, I think I have probably given you more time than any of these other cases have had, and so --

MR. SCHELLER: I appreciate it, Your Honor. I am actually taking up your time, so I'll sit down.

THE COURT: Thanks. Let's start hearing witnesses.

Ms. Lineberger, I believe your guy testified around the country several times, so he must have his preparation down pretty well.

MS. LINEBERGER: The question is, do I have it down.

THE COURT: That might be a question.

MS. LINEBERGER: Yes, Your Honor.

Your Honor, the Government would call Jordan Trecki, Ph.D. to the stand.

JORDAN TRECKI, GOVERNMENT WITNESS, SWORN

THE COURTROOM DEPUTY: Please state your full name for the record and spell your name, for the record.

THE WITNESS: Dr. Jordan Trecki, J-O-R-D-A-N, T-R-E-C-K-I.

MS. LINEBERGER: May I have a moment, Your Honor?

THE COURT: Yes.

(Pause in proceedings.)

MS. LINEBERGER: Your Honor, just for the record, I would ask that my case agent be allowed to remain in the room, as well as my other potential expert witness, Terrence Boos.

THE COURT: Do you all have any problem with that? No one has invoked the rule. It sounds like most of this is not all that specific as to any facts of the case that we would need the rule for.

MR. LUBIN: No objection.

THE COURT: Can we agree that witnesses can stay during the sentencing?

MR. SCHELLER: Yes, sir.

MR. LUBIN: Yes.

THE COURT: Okay. And it looks to me like these, at least the three I saw that you filed materials for, all seem pretty, you know, knowledgeable experts. I have got their vitaes.

Can we dispense with some of the normal qualifying as experts and agree that each of these gentlemen can testify or do you want to take them on?

MR. LUBIN: We agree they can testify. I think it is important to hear some of the background of some of the witnesses, just for you, but we agree --

THE COURT: Okay. Try to shortcut it because I can read these curriculum vitaes, and they all seem to be distinguished scientists, knowledgeable. Why don't you all focus on the points in that area that you think are significant, rather than go through a lot of qualifications.

Okay. Let's go.

MS. LINEBERGER: Yes, Your Honor.

Your Honor, just for the record, I have provided Mr. Lubin with a set of the exhibits, as well as the Court.

I would just note, for the record, that Exhibits 1, 2 and 3 regard the law enforcement witness, who I am not calling at this time. So Mr. Trecki's exhibits begin at Government's Exhibit 4.

THE COURT: Do you happen to have another set? If you don't, that's fine, but if you do --

MS. LINEBERGER: May I have a moment, Your Honor?

THE COURT: Maybe Katy Clifford.

Thank you.

DIRECT EXAMINATION

BY MS. LINEBERGER:

Q. Would you please state your name for the record.

A. Dr. Jordan Trecki.

Q. And where do you work?

A. With the Drug Enforcement Administration.

Q. And what is your position there?

A. I'm a pharmacologist.
Q. And as a pharmacologist, do you have any specialized training to be -- have you had specialized training to become a pharmacologist?
A. My Ph.D. in pharmacology involved a variety of coursework; molecular pharmacology, neuropharmacology, a variety of various lab rotations, thesis research involving pharmacology specifically, behavioral pharmacology.

My post doctorate fellowship was in traumatic brain injury and Parkinson's disease, looking at pharmacological models of those diseases. The Ph.D. thesis requires various steps; courses, exams, dissertations, in order to achieve a degree in pharmacology.

MS. LINEBERGER: May I approach, Your Honor?

THE COURT: Yes.

BY MS. LINEBERGER:
Q. Mr. Trecki, I'm going to hand you what's been premarked as Government's Exhibits 4 thru 22. I'm going to be referring to them as I go through your testimony here today.

Would you just leaf through those and tell me if you recognize them.
A. I do.
Q. And are those documents that you provided to me previously?
A. Yes.

MS. LINEBERGER: Your Honor, I would ask that they be

moved into evidence, and then I'll have him identify them as we go through, with the Court's permission.

THE COURT: Any objection to any of these?

MR. LUBIN: I don't know because we were handed them this morning, and so I thought I would have a chance to look at them as they were discussed, but I have no objection certainly to the CV, that being on top.

THE COURT: I'll provisionally admit them and if you all have a particular problem with any of them -- most of these are articles and other data, so tell me if you want to object at the end, but right now, we will go ahead and consider them.

MR. LUBIN: Okay.

MS. LINEBERGER: Thank you, Your Honor.

(Evidence admitted as Government Exhibits 4 through 22.)

BY MS. LINEBERGER:

Q. Dr. Trecki, is Government's Exhibit 4 a full copy of your resume?

A. Yes.

(Evidence identified as Government Exhibit No. 4.)

BY MS. LINEBERGER:

Q. Now, is a chemist a pharmacologist?

A. No.

Q. What is the difference?

A. A chemist has entirely different training coming up, specifically for a Ph.D., different coursework, different

aspects of looking at molecules, building different chemicals, synthesizing molecules.

A pharmacologist can either look at the molecular techniques; binding assays; functional assays that I'll explain as we go through the presentation; behavioral work, looking at the way the drugs actually interact in a varied system, whether mammalian or insect or some sort of living organism.

A chemist, as I said, different training to achieve a degree, different routes to get there. A pharmacologist takes drugs synthesized by a chemist and does entirely different tests with a drug than a chemist could do.

Q. Do your responsibilities include testimony?

A. Yes.

Q. And what is a Government's Exhibit 5?

A. This was a list I provided to you just as a list of my prior testimony, as well as upcoming testimony, that I have done for the DEA in regards to various synthetic drug cases.

(Evidence identified as Government Exhibit No. 5.)

BY MS. LINEBERGER:

Q. In these cases that you have listed in Government's Exhibit 5, did those cases include testimony with regard to synthetic cannabinoids?

A. Yes.

Q. Have you testified in Federal court before?

A. I have actually only testified in Federal court.

Q. Okay. And did that also include the Southern District of Florida?
A. Yes.
Q. As of recently?
A. Yes.
Q. And you recently testified in the case of Jonathan Osborne; is that correct?
A. Yes, AUSA Osborne. That was in Miami, that was an ethylene sentencing case.
Q. That's right, Osborne is not a defendant, he is a --
A. AUSA.
Q. -- prosecutor, correct?
A. Yes.
Q. And you have several other hearings scheduled in the future; is that right?
A. That is correct.
Q. Now, the Court has your CV, which is Government's Exhibit Number 4. Would you briefly give the Court a summary of your educational training and your professional experience that has led you to your present position.
Summarize it for the Court. He does have a copy of your CV in front of him.
A. My Ph.D. in pharmacology is from Temple University School of Medicine. My primary focus was evaluating cocaine on the rat brain involved with the limbic system as it compares to

humans.

I then did a post doctorate fellowship at Georgetown University School of Medicine in the Department of Neuroscience, as I mentioned before at Parkinson's disease and traumatic brain injury before I accepted a position with the EPA as A neurotoxicologist, evaluating the effects of chemicals on humans, before finally accepting my current position in August of 2012 with the DEA.

Q. In your current position with the DEA, have you become familiar with the substances involved in this case, which are XLR-11, AB-FUBINACA, AB-CHIMINACA, 5F-ADBICA, 5F-AB-PINACA, PB-22, FUB-PB-22 and AB-PINACA?

A. Yes.

Q. What are they?

A. Those eight substances are characterized as synthetic cannabinoids.

Q. All of them?

A. Yes.

Q. And are those the pharmacological names?

A. That is a street name, a new moniker. Some of those names were developed on the street as a name for the drug; some names were developed by researchers that first identified the drugs in illicit samples.

There is a researcher out of Japan who gives the name to the chemical. For example, the AB-FUBINACA, she uses

letters throughout the very long chemical name to come up with the AB F-U-B-I-N-A-C-A name for AB-FUBINACA. So they are not the official chemical name, it is more a name that is little easier to distinguish between the long chemical name.

Q. So it is almost like they are abbreviations, somewhat.

A. Somewhat, yes.

Q. Now, the Court has your list of prior court testimony. To summarize that list, have you testified at trials, *Daubert* hearings, and sentencings with regard to synthetic cannabinoids?

A. Yes.

Q. Approximately how many times, at this point?

A. I believe 20 to 25 times thus far.

Q. Now, are you familiar with the United States sentencing guidelines regarding unlisted substances, such as those I just read into the record?

A. Yes.

Q. Are you familiar with the 22D1.1 application and note six dealing with the chemistry, pharmacology, and potency of what are unlisted substances, those that are not listed in the sentencing guidelines?

A. Yes, I am.

Q. Have I asked you to -- for your expert opinion concerning the chemicals that we had just listed and whether -- or which is the most closely related guideline listed substance to the

substances in this case?
A. Yes.
Q. And have you rendered those opinions?
A. Yes.
Q. And do you hold those opinions within a reasonable degree of scientific certainty?
A. Yes.
Q. Now, I would ask you to refer to Exhibits 6 through 13. Are those summaries of your expert opinion for the substances?
A. Yes.
(Evidence identified as Government Exhibits 6 through 13.)
BY MS. LINEBERGER:
Q. Now, the Court has them and they have also been filed of record previously today. With regard to the substances listed in these documents, these opinions, do you have an opinion -- or what is your opinion with regard to the most closely related guideline listed substance to XLR-11, which is referred to in Government Exhibit 6, specifically and the other synthetic cannabinoids?
A. All eight substances --
MR. LUBIN: Objection, Your Honor. The question was does he have an opinion, because I'm going to object to the opinion on anything other than XLR-11. He was not what the opinion was.
THE COURT: Take it in steps so he can make his

objection.

Apparently, he has an opinion. Do you want to ask him what his opinion is to them individually or together?

MS. LINEBERGER: Well, Your Honor, I was going to try to do it together, since they are similar, but I can do it separately.

THE COURT: Well, his opinion is the same, it sounds like. He thinks it is THC, as I understand his opinion.

Let's hear your objection.

MR. LUBIN: Thank you, Your Honor.

They are all different and the testimony would be all different, we would be here for five weeks. The only thing that matters is XLR-11 for purposes of this hearing, though.

For purposes of you deciding what the ratio is, we are talking about XLR-11 and --

THE COURT: Why is that? Were all of these ordered in part of the case, in relevant conduct, or why do you think it is only XLR-11?

MR. LUBIN: XLR-11 is the only substance in this case that is a schedule one drug, the others are not. XLR-11 is what is setting and/or driving the guidelines in this case. The others have nothing to do with it.

THE COURT: I thought the DEA had added -- had more of them than XLR-11. In 2013, there was some sort of order -- administrative order, and that's been followed up with rule

making that is not quite finished; is that right?

MS. LINEBERGER: Yes, Your Honor.

THE COURT: Are these all schedule one substances under the DEA orders?

MS. LINEBERGER: Your Honor, I would, of course, refer to my expert; but the majority of them have been scheduled and are for purposes of this case.

THE COURT: Let's make sure he identifies the ones that are scheduled and the ones that aren't as we go through this.

MS. LINEBERGER: Yes, he will, Your Honor.

THE COURT: All right.

MS. LINEBERGER: May I proceed?

THE COURT: Sure.

BY MS. LINEBERGER:

Q. Okay. Referring you to Government Exhibit 6, is that your expert opinion with regard to XLR-11?

A. Yes.

THE COURT: Are these all called Spice, or are there different colloquial names for these various ones? As you go through, explain that a little bit, if you don't mind.

THE WITNESS: Would you like me to answer now or wait for --

MS. LINEBERGER: Answer the Judge, first.

THE WITNESS: Briefly, I'll explain. I would object

to the use of the word Spice, it is a street term. It is an incorrect term, same thing as synthetic marijuana. There is no such thing as synthetic marijuana.

These are manmade chemicals. They are called synthetic cannabinoids. Of course, we see in the news even sometimes the DEA referred to them as Spice, but these are purely manmade synthetic chemicals applied to plant material.

As you mentioned before, out of the eight substances in this case, five of them are currently temporally controlled schedule one substances. The other three are not currently listed as schedule one substances.

I have a slide presentation that will actually list the dates of each one, the notice of intent and the final rule is actually written.

Does that answer your question?

THE COURT: Yeah, in part, although some of the -- I guess, when you read about them, a lot of times they use the colloquial street names.

I thought even in the DEA rule making they talk about K2, and there is Spice, and there is confusion to me in terms of what is what. However, you can clarify -- I understand you don't like is the street names and they may be misleading, but to the degree you are able to associate one with the other, it would be helpful to me in understanding the literature.

THE WITNESS: Yes, Your Honor.

In the proceedings from the DEA, I actually took part in many of them and assisted with our section in writing some of them. The terms K2 or Spice is listed in there because that's the term that people understand the way it is used.

Just for clarification, from a scientific point of view, Spice is just a general term, you know, used commonly in the news. That's the term people may associate with on the street, but these are essentially manmade chemicals. But I understand your point that K2, Spice, that is what we are talking about.

THE COURT: Okay. Is K2 different than Spice, or is that just a street name for all of these things?

THE WITNESS: K2 was the package label, the same way I believe in this case, there were Scooby Snacks, various labels; AK47, WTF. There's thousands of packages from different vendors that sell this drug.

K2 was the actual label on one of the first packages of Spice encountered in the United States in 2009. And so since then, since the first packages were called Spice and K2, just like Scooby Snacks or WTF, et cetera, those names stuck since they were the first ones.

The DEA, in terms of evidence that I have seen that has come through DEA or other local law enforcement, I have not seen a package labeled K2 or Spice in over four years that have come in. I have only been with the DEA three and a half, but

1 going back with evidence, that's where the names K2 and Spice
2 originated from.
3 THE COURT: Okay.
4 BY MS. LINEBERGER:
5 Q. Have you -- with regard to XLR-11 in your Government
6 exhibits, which is the most closely related guideline listed
7 substance?
8 A. XLR-11, which is currently a temporally schedule one
9 substance, the most closely related substance listed in the
10 guidelines is THC.
11 Q. With regard to Government Exhibit 7 --
12 THE COURT: Let me -- is it still the case -- at
13 least in some of your DEA materials, you said that there were
14 no human studies. Is that still the case or are they only
15 studies with animals on all of these items or --
16 THE WITNESS: I'll go into great depth about that. I
17 guess it is the definition of a human study.
18 Is there a defined clinical trial with any of these
19 substances, my answer would be no, not that I'm aware of.
20 However, I would present to the Court, which I would
21 do so in the presentation, the now countless numbers of deaths
22 and overdoses in the published reports on deaths and overdoses
23 from these substances serve as both the effects in humans and a
24 strong rationale on why you cannot conduct a clinical trial,
25 specifically when the FDA has said there is no medical use for

these substances.

MR. LUBIN: Your Honor, I just want to have a standing objection. That is a blatant misstatement of the current science.

Now, I can wait until cross-examination, but --

THE COURT: You ought to probably wait, and you are going to have your person, I assume, tell me why this is wrong.

MR. LUBIN: That last statement, that there is any scientific evidence of deaths or other side effects related to XLR-11 is a blatant misstatement.

MS. LINEBERGER: Your Honor, I would object to the speaking objection. Counsel is not the witness.

THE COURT: You all are both probably wasting my time a little bit.

MS. LINEBERGER: I apologize.

THE COURT: I probably got him -- let's go through these presentations and hear them, and cross-examination is the best place to deal with these, I agree.

I understand you don't accept his testimony, but I'm probably going to hear it.

MR. LUBIN: Okay.

THE COURT: Go ahead.

MS. LINEBERGER: Thank you, Your Honor.

BY MS. LINEBERGER:

Q. Government Exhibit 7, is that your opinion with regard to

the substance AB-FUBINACA?
A. Yes. AB-FUBINACA, a currently schedule one substance, and the most closely related substance in the guidelines is THC.
Q. Government Exhibit 8, AB-CHIMINACA.
A. AB-CHIMINACA is currently a schedule one substance, and the most closely related substance listed in the guidelines is THC.
Q. 5F-ADBICA.
A. In regards to 5F-ADBICA, which is not currently listed as a schedule one substance, the most closely related substance listed in the guidelines is THC.
Q. Well, if it is not currently listed as a schedule one substance, what does the DEA consider it to be?
A. In regards to 5F-ADBICA, this substance could be considered a controlled substance analogue, if intended for human consumption.
Q. Well, in your experience with the substances in this case, what else are they used for; fertilizer?
What are people using them for?
A. I can't speak specifically to this case, I don't know the intricacies of this case, but the substances -- all of the eight substances listed in this case, in my experience, these substances are applied to either a vegetable material or dissolved in liquid and intended to be ingested for their psychoactive properties.
Q. Government Exhibit 10, 5F-AB-PINACA.

A. For 5F-AB-PINACA, this substance is not currently listed as a schedule one substance. The most closely related substance listed in the guidelines to this substance is THC.
Q. Would you consider also a schedule one controlled substance analogue?
A. The DEA considers that could be a considered a controlled substance analogue, if intended for human consumption.
Q. Government's 11, PB-22.
A. PB-22, which is currently a schedule one substance, the most closely related substance listed in the guidelines is THC.
Q. Government's Exhibit 12.
A. FUB-PB-22, which is currently not listed as a schedule one substance, the most closely related substance listed in the guidelines is THC. The DEA considers that this substance could be considered a controlled substance analogue, if intended for human consumption.
Q. AB-PINACA, Government's Exhibit 13 for the record.
A. AB-PINACA, which is a currently schedule one substance, the most closely related substance listed in the guidelines is THC.
Q. Now, does that complete the opinion documents you have provided in this case?
A. Yes.
Q. And are all of the substances we just went through one by one, Government's Exhibit 6 through Government's Exhibit 13, are they all considered to be synthetic cannabinoids?

A. Yes.
Q. Whether they are currently scheduled or not?
A. Yes.
Q. Whether they are schedule one or analogue of a schedule one substance?
A. Yes.
Q. Have you prepared a series of Power Point slides to assist you in explaining your opinion and the pharmacology of the synthetic cannabinoid?
A. Yes.
Q. And are those slides found in Government's Exhibit 14, for the record?
A. Yes.
(Evidence identified as Government Exhibit No. 14.)
MS. LINEBERGER: Your Honor, may I have a moment to load this?
THE COURT: Yes.
BY MS. LINEBERGER:
Q. Can you see the monitor?
A. Yes.
Q. And is that the beginning of your slide show?
A. Yes.
Q. Now, this pharmacology slide, which, for the record, is the first slide of the slide show, lists points of efficacy and potency.

A. Yes.
Q. Do they --
THE COURT: You know, I don't mind him largely using a narrative on this, same with their people, and you can --
MS. LINEBERGER: Interject.
THE COURT: -- interject as you see fit.
MS. LINEBERGER: I'm about to --
THE COURT: I guess I'm not interested in a lot of objections, unless you just feel compelled to rise to your feet. I would rather you deal with it on cross-examination.
MS. LINEBERGER: Your Honor, I just want to set him up with this question, and then I'm going to let him go with the Court's permission.
THE COURT: Go ahead.
MS. LINEBERGER: All right.
BY MS. LINEBERGER:
Q. Now, do these relate to prongs two and three of application note six?
A. Yes.
Q. Before I go any further into these prongs and let you go for the Court, what can you tell the Court regarding the first prong of the tests listed in application note six, chemistry?
A. In regards to the three prongs, Your Honor, there is nothing substantially similar to any of the substances in this case chemically or structurally similar to the substances in

this case; so therefore, there is nothing to discuss for prong one, the chemistry prong.

Q. Now, before you -- the Court takes you up on your word and says, you know, there is nothing to discuss, have you had a chance to review the affidavits provided by the Defense?

A. Yes.

Q. Do they conflict with your opinion regarding prong one, chemistry?

A. No. Both Dr. Dudley and Dr. Cozzi are in concurrence, as described in their expert reports, that there is nothing structurally similar to any of the substances in this case listed in the guidelines.

Q. So for the purposes of why you experts are here, the Court is to look at prongs two and three, the pharmacology?

A. The pharmacology, the effect of the drug for prong two, and then what is essentially the potency, the amount of drug needed to compare the various drugs for prong three.

Q. The Court raised a very interesting issue at the beginning of this, so before we begin to go into the prongs and I let you go, are the effects of these substances known as synthetic cannabinoids, are the effects of these substances the same as the effect of marijuana?

A. Absolutely not.

Q. If it is sprayed or laced on to vegetable matter, does that make the effects like marijuana?

A. No.
Q. Tell the Court why not.
A. For the same purpose, if we applied heroin or methamphetamine to green plant material, we would not consider those applications of a single chemical substance to vegetable material to be treated like marijuana simply because you take a green plant material, role it to a joint and smoke it. These are single manmade chemicals.

The marijuana plant, as noted in many published peer review publications, has between 80 and 100 separate cannabinoids in the plant. It has between 500 and 800 different chemicals that make up a living organism in the plant called marijuana.

When you look at drugs like XLR-11 or AB-FUBINACA, or any of the substances is in this case, these are single manmade chemicals applied to an inert, non-psychoactive vegetable material.

When we look at marijuana, when we talk about the potency of marijuana, we are referring to the THC content. However, those other cannabinoids, one specific example is called cannabinol that has been shown repeatedly, even in a clinical trial, to affect the psychoactivity and the mental health of patients as compared to getting THC alone.

The other chemicals that make up the marijuana plant can greatly affect the adverse effects of THC. It is not

appropriate to compare a single drug like XLR-11 to a mixture of 800 chemicals.

It is appropriate to compare XLR-11, a single chemical, to another single chemical, another synthetic cannabinoid, THC, which is listed in the guidelines.

THE COURT: Do these other things ameliorate the impact of the THC?

THE WITNESS: Yes, sir.

THE COURT: So you think marijuana is safer than XLR-11 on inert material, is that your conclusion?

THE WITNESS: Your Honor, it is very -- the toughest part of my job today is to compare two drugs without making marijuana appear safe. I do not agree that it is a safe drug.

The drugs like XLR-11 are substantially worse than marijuana in terms of the adverse effects and the toxicology, the toxic effects of the drugs.

THE COURT: Is there more THC than there would be in typical marijuana, or is that a comparison you can make?

THE WITNESS: THC in what, Your Honor?

THE COURT: This inert -- the XLR-11, is it not THC then? It is something different than THC, too, you are just saying it is like it?

THE WITNESS: The closest related substance that's listed in the guidelines, the best substance that I can choose that is available in the guideline tables is THC.

It is not chemically related. The structure is entirely different, but in terms of the adverse effects, I'm going to demonstrate, using a clinical trial, the FDA insert for synthetic THC, which is a schedule three drug. I'm going to explain that and show you how the side effect profile with the pure THC, that is at least more closely related to XLR-11, but XLR-11 is still more toxic, has more adverse effects, and there have been reported deaths using XLR-11 and the other substances in this case that demonstrate there is no possible way to compare this to marijuana, in my opinion.

THE COURT: So is the THC really very relevant to comparison?

I mean, if you are really looking at it, I recognize the guidelines say you are supposed to pick the closest thing, but it sounds like that would maybe point towards the guidelines just not being that helpful, if THC isn't very similar.

THE WITNESS: Well, I would argue it is similar. They are both cannabinoids, they both act on the same receptor. I'll explain that further.

The adverse effects from a pure form of THC are closer to the side effects that we see with XLR-11, definitely not close to what you normally exhibit after ingesting marijuana. So I would say that the table was helpful, but substances like XLR-11 and AB-CHIMINACA do deserve their own

category in the sentencing guidelines, since the world is definitely moving in an unfavorable direction towards synthetic drugs.

THE COURT: Okay, go ahead. Thank you.

BY MS. LINEBERGER:

Q. From what the Court asked you and your response, is there anything, any other listed substance in the guidelines, that comes close to being like XLR-11 and these other synthetic cannabinoids than THC?

A. No.

Q. Not methamphetamine?

A. No.

Q. Not LSD?

A. No.

Q. Not methylone?

A. No.

Q. Cocaine?

A. Some of the drugs that you have mentioned, some of these side effects -- for example, methamphetamine, cocaine, methylone, these are stimulants, Your Honor.

The synthetic drugs in this case, XLR-11, have shown stimulant-like properties; agitation, excited delirium. You could say that they are both stimulants, but I think the most appropriate substance in the guidelines would still be THC.

Q. Now, cocaine is a schedule two; isn't that right?

A. Yes.
Q. Just briefly -- and I know we got a little off track, but briefly, what is difference between schedule one and schedule two?
A. A schedule one substance has no approved or recognized medical use.
Q. None, no approved?
A. Correct, none.
Q. And cocaine did have something, at one point, to get it on schedule two?
A. Cocaine was originally used as an anesthetic many years ago and the current rational for keeping it schedule two, it can still be used, although I'm not sure on how often, in ocular surgery.
Q. The eyes?
A. Yes.
Q. Okay. Referring you to the current slide that the Court is and we all are viewing, what can you tell the Court about this slide.
A. This was just a slide to demonstrate the second and third prong in the presentation and what I'm here to testify about; the effects of the drug and the potency of the drugs.
Q. Changing to slide two, the second slide, how -- what is cannabidiol and how is it relevant to your opinion?
A. Your Honor, I just mentioned to you about CBD. This is one

of the drugs and marijuana that can affect -- mediate the effects of THC. I'm not going to read this entire slide for you.

The clinical trial I demonstrated or discussed previously is the last bullet. It reads there that a recent clinical trial demonstrated the patients were given either THC alone or THC with cannabidiol, and the results demonstrated that there was increased risk to mental health in patients given just the THC.

It has been repeated in multiple studies, and multiple researchers have demonstrated that there is no psychoactive effects of CBD, but it can mediate the effects of THC. I use this one prime example of why you cannot compare a single chemical like XLR-11 or any substance in this case to a plant with possibly 800 different chemicals.

Q. And marijuana is a naturally occurring substance in the world; is that correct?

A. Yes.

Q. It grows practically anywhere?

A. Yes.

Q. Does THC or any of these synthetic cannabinoids grow anywhere?

A. The synthetic cannabinoids in this case, they are not found in nature. Every one has to be produced synthetically in a laboratory.

Now, synthetic THC can also be made. You can either find it in the marijuana plant or you can synthesize that in a laboratory. One such example is a drug called Marinol. This is a very specific formulation. It is not just THC off the shelf, but it is the only approved FDA version of THC.

If we can go to the next slide, please.

Q. Now, have researchers published articles regarding the substances in this case that the effects are unlike marijuana, are there published articles on this?

A. There are published articles that speak in generality to synthetic cannabinoids. Specifically, even as far back as 2009, researchers in Germany, where the synthetic cannabinoids were first abused as early as 2004, demonstrated that these were likely psychoactive properties and that they purposely risked the health of consumers.

In a paper in 2014, Dr. Makowiecka demonstrated that the symptoms were not typical of marijuana; that the substances had long halflives and had active metabolites; and that the unlike-marijuana symptoms, including loss of consciousness, acute psychomotor agitation, hallucinations, and seizures, these were not the symptoms exhibited following ingestion of marijuana.

Q. Moving from slide three to slide four, what can you tell the Court regarding the columns in this slide.

A. Your Honor, these adverse effects that I have listed are

pulled directly from published case reports involving a variety of synthetic cannabinoids. Many on here are specifically involving XLR-11.

And there is a subsequent slide, I believe second to the last in the presentation, that will list the specific adverse effects on here that had been referred to just XLR-11. Some of them included anxiety; the hallucinations; the hypertension; the organ failure, specifically kidney failure in patients after ingesting XLR-11; the rhabdomyolysis.

This is where your muscles begin to breakdown after ingestion of a substance like XLR-11 and then clog the kidney and then cause kidney failure and then, of course, death after ingestion of XLR-11.

THE COURT: I thought your DEA materials in June, your rule making, said there had been one death attributed to XLR-11. Are there more since then, or is that inaccurate?

THE WITNESS: May I ask what you are referring to, that DEA thing in June?

THE COURT: There was a rule making notice that DEA put out in June of 2015, where it talks about the need for this rule and what they were doing, and there is a description, as I recall, of, you know, why they were doing it.

It was in that same one that said there were no studies, but I thought it said that there had been one death attributed to XLR-11. It could be my memory is failing me, but

I thought it said that.

THE WITNESS: Your Honor, I believe you are correct that it was the final rule making proceedings. XLR-11 was temporary controlled on May 16th, 2013. That rule procedure lasted two years, with a possible extension for one year given to us by Congress.

I believe you are referring to the proceedings to extend that temporary scheduling order by one year. I think that's what you are referring to.

THE COURT: I thought it was to make it permanent.

THE WITNESS: It was to make it permanent. It is the proceedings to make it permanent, it just has not finalized yet.

THE COURT: Anyway, it seemed to say that, and I think there was a mention of kidney failures. But I was just trying to, again, get some sense of how dangerous this -- I mean, if you look at these adverse effects you have on the chart, it sounds pretty bad.

I'm trying to, in my mind, compare it, for example, to cocaine, where there are lots of deaths -- I mean, maybe it is hard to make that comparison -- or heroin or marijuana, I guess, or none that I have at least known of, but --

THE WITNESS: I'm going to get to that further in the slides, but I want to answer your question.

There are many deaths, and a paper showing more

deaths just came out in the past few months, so there have been more deaths with XLR-11.

XLR-11 was an earlier chemical, one of the first that we encountered back in 2011-2012; hence, the proceedings that -- when it was temporary controlled May 15th, 2013.

The deaths have increased around the country, the overdose clusters, which I'm going to demonstrate here. Unlike cocaine -- cocaine has been around possibly a thousand years. I mean, Siegmund Freud wrote about it in the 1800s. These cannabinoids, even the earliest research was done, and these were found in the 1980s.

The epidemic that is currently plaguing the country with synthetic drugs, specifically synthetic cannabinoids, the first encounter by Customs and Border Protection was only in November 2009, so this is an earlier phenomenon that has only been around for a few years, yet it is already making major headlines with severe toxicity, the adverse effects that you are seeing on this slide. The deaths have been mounting.

The XLR-11, since it was scheduled, has tapered off and many new ones. There are between 16 to 100 that we currently track on the illicit market.

When you think of cocaine, there is one cocaine. When you think of methamphetamine, there is one methamphetamine. With heroin, you might have some Fentanyl analogues, but there is one heroin.

When you look at synthetic cannabinoids, we have a few hundred that are currently floating on the illicit market, each one distinctly different, yet substantially similar to each other. The manufacturers tweak the chemical structure just ever so slightly in an attempt to skirt the law, yet they need to retain the pharmacological effect because the users still want to get high.

They only tweak it ever so slightly, but there are, in the paper I'm going to demonstrate -- I published a paper in July of this year in the New England Journal of Medicine. In that paper I demonstrate a large variety of drugs responsible for overdoses, and I list 20 separate deaths, some involving XLR-11, some involving AB-CHIMINACA in this case, the AB-FUBINACA, the AB-PINACA.

So in terms of just XLR-11 deaths, only so many have been reported; yet when you take all of these synthetic cannabinoids, the deaths have been mounting. And also I'm only aware of the deaths that either get given or shared with DEA or that I can track down.

Many medical examiners and coroners list a cause of death, but don't necessarily share the data with DEA, so I have to actually go out and find them and demonstrate the effects of some of these drugs.

THE COURT: Okay.

BY MS. LINEBERGER:
Q. So it is conceivable that somebody presents themselves at the emergency room or dies in their house, and they diagnose it as kidney failure. If they don't do a toxicology -- run a toxicology screen, they may miss the fact that the person was smoking synthetic cannabinoid, correct?
A. That happens quite often.
There are no readily available clinical tests. When you go to a hospital, they can test you for meth, heroin, cocaine, marijuana, the basic clinical chem panel whenever they check your blood. But each of these synthetic cannabinoids, each one of them requires their own specific test and so clinical laboratories and hospitals do not have the technology to test for these. So many times, the diagnosis is missed and they can only treat the symptoms, as we can see in many of the published case reports.
Q. This slide concerns Marinol. Now, you did mention Marinol to the Court, and a type of synthetic THC. What -- evidently, since it is a drug, has it been approved by the FDA?
A. Marinol, as I discussed before, is the only approved FDA formulation of THC. The C3 at the top right there designates a schedule three substance. This is synthetic THC. It is a very specific formulation to deter abuse where the THC is dissolved in sesame oil and then encapsulated in a gel capsule meant for oral injection only.

It is indicated for two types of patients, either AIDS patients with anorexia and weight loss or chemotherapy patients who did not respond to additional therapies. That's what it is indicated for.

The importance of this, this was a clinical trial done by the FDA or through the FDA, approved. And I listed on the very bottom -- and this is directly copied from the insert -- the adverse reactions from this drug.

When you look at the cardiovascular effects; the tachycardia, the nausea and vomiting, which definitely are opposite of marijuana. The nervous system effects; the confusion, the anxiety, the hallucinations, paranoid reactions.

I present this to the Court to demonstrate that these symptoms are more in line with the symptoms from the synthetic cannabinoids, the Spice drugs that we see on the illicit market; the XLR-11, the AB-CHIMINACA, although those drugs are much more severe, much more toxic.

But as demonstrated in a clinical trial, even these side effects are not indicative of what you would expect following ingestion of marijuana.

Q. So basically, it's approved to help people that are, for lack of a better word, suffering from terminal illnesses already.

A. Correct.

Q. So in order to make their lives more tolerable, what they

have left of it, they are given this drug, despite the adverse reactions.

A. Despite the adverse reactions that could occur following ingestion of Marinol via oral ingestion, drugs that work often have side effects.

The efficacy, the effect of the drugs, the good outweighs the bad in these specific formulation in these indicated patients.

Q. Now, have you prepared a slide with regard to the control actions regarding synthetic cannabinoids, as you and the Court had discussed previously, the scheduling of the various substances?

A. Yes.

Q. And is that found in the sixth slide of this presentation?

A. Yes.

Your Honor, as I mentioned before, this is just a list of control actions. This includes DEA temporary scheduling authority, as well as congressional authority.

If you look at the publication list on the right, FDASIA, also know as the SDAPA, signed by Congress and the President, the Synthetic Drug Abuse Prevention Act occurred in July 2012. These are just some examples of the scheduling authority.

Out of the eight substances in this case, five of them, the XLR-11, the PB-22, AB-FUBINACA, AB-CHIMINACA, and

AB-PINACA, as I mentioned before, are all currently temporary controlled under schedule one of the CSA.

Q. And as you testified earlier, the rest are analogues of the controlled substances; is that correct?

A. The other three substances, DEA refers to a court and a jury to determine if a substance is actually an analogue; however, the three substances in this case, DEA would support a case, in our opinion, that those substances could be considered controlled substance analogues, if intended for human consumption.

Q. Because they, too, are synthetic cannabinoids?

A. Yes.

Q. Now, have you prepared slides regarding some of the substances in this case, listing a portion of the seizures in the United States?

A. Yes.

Q. Well, are you aware -- how many documented ports of entry are there in the United States?

A. There are currently 328 ports of entry that are controlled by Customs and Border Protection.

Q. So if somebody crosses the border somewhere else, outside of that, that's not in that figure; is that correct?

A. That's not in the 328, correct.

Q. And with regard to the portions of seizures found in slide seven, what are the largest states for those seizures at those

ports?

A. Well, just as a preface, on the next four slides, Your Honor, I prepared this. This is data given to DEA, and it has been published in our supplemental material, whenever we temporary control a drug, so this is available to all. I simply put the data onto a map and used circle diagrams.

This is an example. This is just from one port of entry, from San Francisco, one site, demonstrating the seizures of UR-144 and XLR-11 that came through that single port in the time period listed at the top of the slide.

The purpose of this is to demonstrate the widespread shipping of these chemicals throughout the country. Specifically, the largest states are California and Texas, with other states like New Mexico, Utah, Washington and Florida following behind.

As XLR-11 was temporary controlled in May 2013, the seizures of XLR-11 tapered off as new chemicals, like AB-CHIMINACA, AB-FUBINACA, AB-PINACA took their place.

If you go to the next slide --

THE COURT: Does most of it come from China?

THE WITNESS: It all comes from China, Your Honor. I have yet to see a seizure or a chemical that has not originated in China.

I have seen a few -- you can count on one hand examples -- where a package was shipped to either Europe or

somewhere in Australia, repackaged and then shipped, but the original -- or the origin of the chemical was China.

This slide looks at three chemicals; two of them that are this case, 5F-PB-22 and AB-FUBINACA. Once again, largest states simply from -- and these are just selected seizures. There are many other chemicals that come through, these are just one example from San Francisco.

Once again, Texas and Florida lead the way with these chemicals; however, you can see dots throughout the country, and it's a widespread shipping of the various chemicals in kilo form.

On the third slide, these are newer chemicals, the AB-CHIMINACA, AB-PINACA and THJ2201. These were currently controlled in January of 2013, these are some of our newest control actions. Once again, lower amounts because these are newer drugs, but once again, shipped across the country.

And the last slide here for the states, I simply pooled the data. This is an example of the seven chemicals I just told you about, just the seven. There are over 100 chemicals that are currently on the illicit market that were either controlled, that have tapered off, or are currently increasing in terms of their numbers.

You can see here the larger states; Texas, California, Nevada, New Mexico, Florida, this is where they have intercepted and CBP seized the drug. This does not show

you how much got through, we will never know that.

As I also mentioned, there's 328 ports of entry; this is data from just one. I am aware that the drugs in this case did not come through San Francisco, they came through New York.

BY MS. LINEBERGER:

Q. So these slides are your West Coat port of entry.

A. One of them.

Q. Okay. So is it fair to say that if you add the East Coast port of entry, it might be even bigger circles?

A. Well, I can tell you simply from the data we received from Customs and Boarder Protection, there are 20 or 30 other chemicals on there that I could have given you slides on FUB-PB22, on ADBICA, on 5F-AB-PINACA, on AM2201, on countless other chemicals that would make the whole slide become red.

These slides, I only prepared them because this data has been published with our federal registered notices whenever we temporary control a drug, just to demonstrate a small example of the amount of drugs coming into the country that you just don't always see on the front page of your local news.

Q. So this is just in a -- just shy of a three-year period --

A. Approximately.

Q. -- is that correct?

A. Yes.

Q. And you testified to the Court earlier, cocaine has been around for hundreds of years. This is the new thing?

A. The world is moving more towards these synthetic drugs; the bath salts or cathinones, the synthetic cannabinoids, the tryptamines, the fenethyllines, the hallucinogens, the bath salts, the NBOMEs, N-B-O-M-E, which are newer forms that are closer to LSD in terms of their psychoactive effects.

Yes, in my opinion, this is where the world is changing to.

Q. Now, you brought out the topic of bath salts. Now, okay, you didn't like the word Spice, you like the word bath salts?

A. Unfortunately, bath salts -- you can by bath salts at Bed Bath and Beyond. They don't cost nearly what you buy, you know, behind the counter, the alpha PBP, one of the more popular names is flakka, but these are street names. Bath salts, flakka, they are street names that you can use for these various drugs; yet just like flakka, when you use flakka, you don't really know what is in flakka. It has to be tested by a laboratory to determine is it alpha PBP, is it methylone, like synthetic --

MR. LUBIN: Objection, relevancy. This is so far afield to anything in our case.

THE COURT: Well, overruled.

Let's kind of move past bath salts, unless it has something particularly to do with this.

BY MS. LINEBERGER:

Q. Well, the Bed Bath and Beyond bath salts are going in the

bath to make somebody's skin smell better and be softer, right?

A. Presumably.

Q. That's not what you are talking about here, though.

A. Correct.

Q. That's sold on the street?

A. Yes.

Q. Just making sure.

THE COURT: Hadn't this been sold in 7/Elevens, and is it an incense?

BY MS. LINEBERGER:

Q. Can you talk about that quickly.

THE WITNESS: Please repeat, Your Honor.

THE COURT: Let's just kind of -- let's move through the charts.

MS. LINEBERGER: Yes.

BY MS. LINEBERGER:

Q. Have you ever tried to burn synthetic cannabinoids as an incense, does it make it smell like perfume in the room?

A. I have not. Case reports from field agents that I have read at DEA and also user testimony that I have been present for said when you burn these chemicals, it smells absolutely horrendous, but that's simply -- that's hearsay.

Q. So it is not tootie fruity, cherry, or --

A. They are labeled as that. The manufacturers can put

flavors in them, but I don't under -- I don't have any knowledge to -- how it actually smells or the effect on the taste of the actual substance.

Q. Okay. Moving to the next group of slides --

A. I'm sorry, before you proceed --

Q. Please.

THE WITNESS: Your Honor, the next slide is actually the movie. I just wanted to preface it before it plays so you know what you are looking at.

THE COURT: Okay.

THE WITNESS: Along with a colleague of mine at DEA headquarters, we put the slide together. The largest outbreak in terms of synthetic cannabinoids ever to occur in the United States occurred in April of May of this year.

The next slide you are going to see a bubble chart similar to this one, it is going to demonstrate -- the dates are going to be at the top as the dates proceeded from the end of March until about the end of May.

You are going to see various bubbles appear on the chart which will demonstrate how the magnitude of various outbreaks increased, and then on the bottom, you are going to see the deaths that were attributed to this specific outbreak. Of these 34 deaths attributed, we have confirmed 15 of the deaths via autopsy and toxicology results.

THE COURT: And what was the material?

THE WITNESS: The predominant material was a new synthetic cannabinoid called MAB-CHIMINACA; however, there were also 12 other substances, including XLR-11, PB-22 and AB-FUBINACA also found.

This outbreak covered at least 12 states, and there were at least 2,500 emergency room admissions from the outbreak specifically.

THE COURT: And that -- but that material is not one of the ones in this case?

THE WITNESS: The predominant material was not; but as I said, there were some smaller overdoses in that outbreak that did include some of the substances in this case. But the predominant one was a brand new one called MAB-CHIMINACA.

THE COURT: Okay.

MS. LINEBERGER: Are you ready?

For the record, the slide does appear to be moving.

THE WITNESS: So just to recap, Your Honor, the overdoses began in both Austin and Corpus Christi, Texas.

They then moved -- the largest amount of overdoses was in the State of Mississippi, centered in Jackson, but throughout the entire state.

The overdoses proceeded then through Alabama; Norfolk, Virginia; Hampton, Virginia; Hangerstown, Maryland; New York City; Syracuse, New York; Hartford, Connecticut; the State of New Jersey; Allentown, Pennsylvania; Harrisburg,

Pennsylvania, Nebraska, and Iowa.

As I said, this overdose in -- between April and May 2015 resulted in over 2,500 overdoses as determined by public health departments in Mississippi and Alabama. At least 34 deaths were attributed to the overdoses, and that was information given by the public health departments in those states.

Both states declared states of emergency and requested CDC assistance. And of the 34 deaths, I have received information on at least 15 of them confirming the death was attributed or caused by solely a synthetic cannabinoid.

Most of the cases were either AB-CHIMINACA, which was in this case. The first two cases in Corpus Christi, Texas were AB-CHIMINACA, and predominantly were either MAB-CHIMINACA or XLR-11.

THE COURT: There was a sentencing in Texas with some of these synthetic products. Does that relate to this chart or not?

THE WITNESS: No, Your Honor.

As you may be more aware than I am, these sentencings and hearings and trials sometimes take a few years before they proceed from indictment to sentencing.

I believe -- are you talking what I just testified in or something else that you are aware of?

THE COURT: I'm just aware there was a sentencing in the last -- it seems like in the last year in Austin, I think --

THE WITNESS: That was -- I was part of that, Your Honor.

THE COURT: -- involving synthetic marijuana or cannabinoids, and I read about that sentencing. I was curious if it related to this epidemic here that you are talking about or something else. It sounds like something else.

THE WITNESS: That was a previous epidemic or cluster. I did testify in that with AUSA Mark Marshall and AUSA Sheri Pearce (phonetic) of Austin, I believe that was October. It's probably on my sheets, one of the exhibits for my testimony; but that was not related to this specific overdose or outbreak.

THE COURT: Okay. Thank you.

BY MS. LINEBERGER:

Q. Well, you talk about outbreaks, are there -- is it like there are clusters of these; they pop up and the whole town gets sick basically around a certain time of year? What do you mean clusters?

A. I give my own definition for clusters. I worked with colleagues at the CDC and University of California at San Francisco specifically on the paper I'm about to talk about with you.

A cluster for us was just defined as more than two people. If there was a single overdose or two people, we didn't define that as a cluster. Three or more is what we used to define a cluster, but I'm not sure if there's a standard definition for what a cluster is.

However, most of the clusters involved, many times, more than ten patients, sometimes up to 100, 200 patients.

The cluster of illness, as demonstrated on the next few slides, have both increased in the severity, as well as the incidents across the country.

Can we go to the next slide, please.

Q. Yes. Referring to slide 13?

A. Yes.

Your Honor, this was the CDC report from the Mississippi state when they requested assistance. This is synthetic cannabinoid related emergency room admissions. You can see in 2015 -- the numbers below, the 01, 02, 03, 04, 05, those refers to the weeks in the calendar year. Weeks 12 and 13 refer to the end of March.

This was similar to the slide, the movie that you just saw previously. You can see how the numbers, the incidences greatly increased over that six- or seven-week period. In the State of Mississippi alone, they had 1,218 overdoses, in that six- to seven-week period.

On the next slide --

Q. Slide 14?

THE COURT: Do you know what that material was?

THE WITNESS: What I mentioned before; predominantly the MAB-CHIMINACA, although there are some -- a few cases of other individual cannabinoids, including XLR-11 or PB-22; but the predominant one was not in this case, the MAB-CHIMINACA. It's the newer one on the market currently.

This is that same grouping, broken down by age groups. This demonstrates that your age group abusing this drug, your main category is 18 to 24 year olds; however, your 13 to 39 year olds is your larger cluster.

If you look at the 13 to 39 year old category, that represents just over 80 percent of overdoses that occurred in Mississippi in that six- to seven-week period.

Why this is important, the paper that we just published, colleagues of mine and I, in July of this year, we describe 20 deaths. This is by no means all of the deaths that have occurred, this is just what was presented or shared with DEA.

Just like in this slide here, 75 percent of the deaths that we collected fall in the same category, between 13 and 39 years old. In fact, seven of the deaths were under 19 years old.

Can we go to the next slide please.

This is the paper I was just discussing, we published

this in the New England Journal of Medicine back in July of this year. Once again, I have to reiterate that this is not all of the clusters, nor all of the deaths that have occurred from these drugs. These are simply the ones that my colleagues and I were aware of or were shared with either the CDC and DEA and that we were able to get definitive testing on to demonstrate the drug involved.

If you look at the top, you see two cases or clusters occurred in 2012. Two also occurred in 2013. By 2014, you had nine examples of clusters and you can see, on the right-hand side, the various substances. Some involved in this case, the XLR-11, the AB-FUBINACA, the AB-CHIMINACA, AB-PINACA is on the table.

If you go to the next slide please, the data for this paper we stopped collecting in April of 2015. This was at the beginning of the very large outbreak I just discussed. You can see the drug identified on the bottom right-hand corner was the MAB-CHIMINACA. However, in just the first few months of 2015; once again, we had nine clusters of overdoses.

Your Honor, since April, there has been more than 30 additional clusters of overdoses. In the last three weeks alone, I have tracked three overdose clusters in San Diego, California, each with over ten people, between ten and 15.

In Anchorage, Alaska, since August of this year, they have had 80 overdoses and up to 14 deaths attributed to

synthetic cannabinoids.

In Tulsa, Oklahoma, the week of October 20th, they had 25 overdoses. Two weeks ago in Hopkinsville, Kentucky, they had 13 people present to emergency rooms after overdosing from synthetic cannabinoids. On Monday of this week, they called me and said they had another outbreak.

In Mississippi, there were ten overdoses three weeks ago due to synthetic cannabinoids. And just last week in Orlando, Florida, there were 25 an overdoses attributed to synthetic cannabinoids. This is just in the last three weeks.

The incidents, the severity has just increased incrementally over the past few years.

BY MS. LINEBERGER:

Q. Are the hospitals becoming -- and coroners' offices now becoming more sophisticated to look for the substances now, as opposed to back when they first came on the market?

A. The hospitals, from talking with physicians in published reports, there are no anecdotes to these drugs. There is no Narcan, like you have for the opioids. For these drugs, they can only treat symptomology.

However, the substance is usually only identified if my colleagues and I attempt to intervene and collect samples in order to attempt to identify the substance or, unfortunately, in post mortem samples, once someone dies only does a coroner or medical examiner go the extra step in an attempt to identify

substances in the toxicology.

Q. And is it fair to say, as the time progressed from 2012 through and into the end of 2015, that you see the substances changing from month to month or cluster to cluster, all of them being synthetic cannabinoids?

A. All of the substances here are synthetic cannabinoids. The substances do change in an effort to either skirt the law; however, we do see cases where substances that have not been around for a while or were already scheduled and are schedule one substances still appear.

If you go to the next slide, this is a second part of the chart in our paper that described many of the single cases and many of them resulted in death.

You can see how the drugs continue to change, if you go just to the next slide.

One example, the very last -- the last death that we collected for this paper, in Killeen, Texas, January 2015, AB-CHIMINACA, one of the drugs in this case, that's one of the newer drugs. AKB48 and XLR-11, these drugs were temporary controlled, May 16th, 2013; however, they are still showing up in samples, in products, and still causing illness; and in this case, this death was attributed to just those chemicals. There was nothing else found on his person or toxicology and the death was ruled an overdose due to synthetic cannabinoid intoxication.

Q. Well, if they don't die, is it your opinion that the illnesses are very serious from these drugs.
A. Based upon published research reports, case reports and the literature, the adverse effects from these drugs that do not result in death are still extremely serious; seizures, possible coma, organ failure, extremely serious side effects.
Q. And these are adverse effects after the synthetic cannabinoids, like XLR-11 and like the other ones in this case, it is after they have been consumed on some sort of vegetable matter; is that correct?
A. In most cases, they are consuming it via vegetable matter; however, in recent months, there has been a small shift where the synthetic drugs are now put into liquid for use in either e-cigarettes, the vapor pens. You see the more popular being sold in malls, but there is a slight shift towards vapor products in liquids, a more discreet method of smoking than applying them to vegetable material.
Q. Is it still dangerous if it is put in an e-cigarette or vapor pen?
A. Yes.
Q. What about if it were just sprayed on to construction paper?
A. The drug doesn't change, it is still the same drug. And the amount you ingest, you know, correlates to the adverse reactions in some cases; however, even the smallest amounts

have been shown to have very serious side effects or cause death.

Q. Moving along to the 19th slide, for the record, would you please explain the various methods that are used to evaluate the pharmacological effects of a drug and are these tests widely accepted in the scientific community as reliable studies and methodologies?

A. The studies I'm about to explain have all been published, widely accepted, used for decades, and are reliable methods to evaluate the pharmacological effects of these drugs.

Q. Have these tests been peer reviewed?

A. Yes.

Q. Written about?

A. Yes.

Q. Published?

A. Yes.

Q. Let's talk about the first one.

A. Structure activity relationship, this is the most basic way you can look at two substances and predict the effects. This is where you know a lot of information about substance A, but you have no information about substance B. You can look at the core structure and predict if the substance is going to have a similar pharmacological effect. The limitation is that it is only predicative.

The next example, in vitro studies. In vitro is

Latin for in glass. These are your test tube, molecular studies. The binding assay, this a way you can look at the affinity, how much of an attraction is there going to be between the substance and the receptor.

The substances in this case bind to the CB1 receptor. Cannabinoids have two receptors, either CW1 or CB2 predominately. The CB1 receptor is the receptor responsible for the psychoactive properties of cannabinoids. CB2 is for the antinausea, anti-pain suppressant effects of cannabinoids.

Once again, the in vitro binding assay only tells you how tightly a drug will bind to the receptor. It tells you nothing more than just the affinity.

The next category of in vitro test is called functional assay, also molecular study. This goes one step further and will determine, on a molecular level, will this substance cause the agonist or the expected effect.

The agonist effect for these drugs would be psycho activity, for example, or an antagonist effect; is it going to block, for example, the psycho activity.

For in vitro tests, you can look at potency and studies discuss the word potency, but this potency does not necessarily translate to the effects in humans.

So it is very important, you need the drug discrimination data in order to evaluate the effects in humans in terms of potency. You cannot extrapolate potency results

for in vitro studies.

The next category are the animal studies, specifically the drug discrimination. This is a study where you evaluate animals, where you give them the specific -- the test drug, for example THC, and they learn a specific behavior.

You then switch out the THC and you observe the behavior -- I can go into this in more depth, if necessary, but the results demonstrate if that's -- the substance will substitute for THC. So, for example, in this case, the XLR-11, the animals could not differentiate between the XLR-11 and the THC.

The last category we look at are tox reports, hospital admissions, law enforcement data. The largest amount, the increasing amount of adverse effect data, the deaths, the severe reactions to these drugs, specifically XLR-11, is the prime reason why you cannot administer these drugs in a clinical trial.

Number one, these drugs have been deemed by the FDA to have no medical use; hence, they are placed at the schedule one.

In my opinion, when a drug causes serious adverse reactions, including kidney failure, seizures, and/or death, it is unacceptable to attempt to test this drug in the clinical trial when the FDA has said there is no medical benefit.

On the next slide, I go through these tests

specifically as it relates to XLR-11.

As I mentioned before, my opinion as the -- is that the hallucinogenic effects of XLR-11 on the central nervous system are substantially similar to THC and XLR-11 is at least as potent as THC.

In our molecular studies, both XLR-11 and THC bound to the same receptor with very high affinity. In the functional assay, the THC was a partial agonist. The difference betweens these is that a partial agonist has a sealing effect. It could never achieve the potential as a full agonist. This demonstrates that XLR-11 acts in an increased manner than the THC does.

In the drug discrimination, as I mentioned before, after the animals were trained on THC and then substituted with the XLR-11, the animals could not differentiate between the two drugs, they responded the same.

Lastly, looking at the effects on humans, for THC, the adverse effects listed here are from that clinical trial with the Marinol that I described before. They include the anxiety, the confusion, hallucinations, tachycardia.

When you look at the effects of XLR-11, as published in case reports, they include nausea, vomiting, organ failure, seizures, tachycardia, they required intubation, and death.

Q. So XLR-11 has organ failure, intubation, and death. Isn't that worse than what THC has caused in those studies?

A. Yes. As I mentioned before, the side effects, the adverse effects from XLR-11, while I would compare the most closely related substance in the guidelines to THC, the effects of XLR-11, in my opinion, are much worse.

Q. Worse than THC?

A. In terms of adverse effects, correct.

THE COURT: But you are using the Marisol (sic) for this THC?

THE WITNESS: The Marinol, Your Honor.

THE COURT: Marinol, that's the controlled dosage though, and I think the incidents on your chart was 3 to 10 percent --

THE WITNESS: Yes, Your Honor.

THE COURT: -- of any of the more serious side effects. The others were, I guess, the anxiety and nervousness and isn't that --

THE WITNESS: Yes, yes.

THE COURT: So it is a bit of comparing apples to oranges, isn't it?

THE WITNESS: I don't understand your comparison.

THE COURT: Well, if you are using this data from your -- is it Marisol (sic) again?

THE WITNESS: Marinol.

THE COURT: Marinol, where it is a controlled dosage, and as I say, it is only 3 to 10 percent incidents of adverse

effects according to that chart you showed me.

THE WITNESS: Correct.

THE COURT: It would seem like it is hard to compare the two.

THE WITNESS: What I'm comparing are the reported adverse effects.

True, the clinical trial mentioned the incidents rates of the adverse effects, but that's what was reported in the clinical trial. If you are going to go have an adverse effect from THC, given oral dosages of it, these are the side effects that you would --

THE COURT: But we don't really have any data in terms of incidents because there has never been any testing.

THE WITNESS: Yes, Your Honor, I would agree with that.

THE COURT: You just kind of have --

THE WITNESS: The testing, the human studies, there is no clinical trial with XLR-11, it is simply the reported adverse effects from ingesting the drug.

THE COURT: Okay.

BY MS. LINEBERGER:

Q. So Marinol is the safest form of THC you could administer to a person; is that correct?

A. Under medical supervision, THC, the only form that you could -- a physician could prescribe to a patient is Marinol

in various dosages. I believe the lowest dosage is three milligrams or two-and-a-half milligrams, I believe, is the lowest dose of Marinol.

I think, Your Honor, it would also be important to note, in that clinical trial, a portion that I did not put on the slide here, the metabolism of synthetic cannabinoids, similar to the metabolism of opioids, have what is called a very high first-pass metabolism.

This means that when you ingest the drug orally, a large percentage of the drug is degraded and is not available to work inside your body.

In the clinical trial, the FDA notes that 80 to 90 percent of the Marinol undergoes first-pass metabolism. So even with the smallest dose, a very, very tiny amount of that Marinol is actually available to elicit its effects on the body, yet you still saw 3 to 10 percent of those patients exhibit adverse effects.

The XLR-11 is predominantly ingested via inhalation. So the route of ministration, if THC were to be ingested or applied to plant material in the same manner as XLR-11 was applied to plant material, the adverse effects would be even more closely related to XLR-11; yet XLR-11, if you look in that second line where it shows it was a full agonist, the XLR-11 would still be worse than the THC itself.

Q. Because THC is still partial, whereas XLR-11 is a full agonist, correct?
A. Correct.
Q. Are you ready for me to go to the next slide?
A. Please.
Q. You discussed a lot of the pharmacological effects related to prong B of the test. Can you now go into the potency discussion, which we are now viewing slide 21 for the record?
A. Briefly, Your Honor, these are the published data from the drug discrimination study. ED50, if you are not aware, stands for effective dose of 50 percent. This is a benchmark that scientists use to compare various drugs within a study. It actually refers to the dose required for 50 percent of the animals to respond.

It is not important to note that only 50 are responding. As I said, it is just a benchmark to compare various drugs.

If you look at the chart from their table, THC had a drug discrimination value of .85 milligrams per kilogram. The lower the number, the more potent the drug. It means that less drug is required to get 50 percent of the animals to respond.

Of the drugs in this case, XLR-11, PB-22 and AB-FUBINACA are all listed in this chart. XLR-11, the ED50 value is .18. PB-22, the value is .20, and AB-FUBINACA has an ED50 value of also .18 milligrams per kilogram. This

demonstrates that these drugs specifically are approximately four times as potent as THC in this assay.

This was done in animals; however, this was a study contracted via DEA through NIDA. NIDA stands for National Institute on Drugs of Abuse, widely considered the gold standard on drugs of abuse research. They also supply a large percentage of funding to researchers around the country to study various drugs and abuse.

NIDA reviewed the study, DE reviewed the study. It was then published in a peer review journal. These researchers have done this type of data before, they've published multiple previous papers.

This demonstrates that the results here are not only factual and true, the false positives do not exist. The information here is accepted by the scientific community. The study has been conducted for over 30 years, drug discrimination comparing the effects of these drugs, and directly can correlate to the effects of these drugs in humans.

THE COURT: So that means that 50 percent of them show some signs of the drug, is that what it is?

THE WITNESS: Once again, we -- I ask that you don't get hung up on the 50 percent number, it is just a benchmark. All of animals responded. You can have an ED90 value, ED80.

THE COURT: In terms of response, it is just some response. This doesn't measure how, I guess, the -- how

harmful the response is, it is just whether or not they respond?

THE WITNESS: The animals -- the actual test involves two levels in a box. It is a simple method, but a method that has been validated and used by scientists for quite some time.

The animal is trained to either press a saline controlled lever or a THC lever based upon what they are feeling after injection. The animal is trained over 60 times until they learn the behavior, so they press the correct lever. Once they press the correct lever, they get a food pellet as a reward.

When the animal has successfully pressed the correct lever over 80 percent of the time, the animal is then switched with the experimental drug; for example, XLR-11, PB-22. The animal is then observed to see if they can differentiate between the THC and XLR-11. The animals are completely -- the word is that they substituted -- XLR-11 was substituted for THC. The animals could not differentiate between the XLR-11 and THC.

This test does not look at the adverse effects. In effect, the researchers do not want to give a dose so high that it is going to kill the animals. It is a dose appropriate to get them to respond without harming the animals, effectively.

BY MS. LINEBERGER:

Q. So in the drug discrimination assays, it actually took less

of the XLR-11, PB-22 and AB-FUBINACA to get them to react than the THC did?

A. Yes.

Q. So does that mean they were more potent than the THC?

A. Yes.

Q. Well, I guess since THC is the closest thing in the guidelines, then 167 is a gift.

MR. LUBIN: Objection to the form of the question.

BY MS. LINEBERGER:

Q. Isn't it?

THE COURT: Sustained.

BY MS. LINEBERGER:

Q. Well, what do you think? In your opinion, do you agree -- as the guidelines stand now -- they are what they are -- do you agree that it's as low as 1 to 167?

MR. LUBIN: Objection to the form, leading.

THE COURT: Overruled.

BY MS. LINEBERGER:

Q. What is your opinion on that?

A. My opinion is that, number one, the closest related substance in the guidelines is THC; that these substances, as demonstrated by this study, are more potent than THC, approximately four times as potent as THC.

The Sentencing Commission goes through a very exhaustive process, as defined in their -- their current

volume. On page 11, paragraph five -- or section five, they state that they have gone over 40,000 convictions and up to 10,000 presentence reports to give a very conservative value.

I don't know if you would just simply take 167 times four to demonstrate the value for this, but it would seem to -- it would be sensible that the drugs in this case would get a much higher value from the sentencing commission than 167 --

MR. LUBIN: Object to that answer again and ask that it be stricken as incompetent for this witness to discuss.

THE COURT: Overruled.

BY MS. LINEBERGER:

Q. Well, there are substances out there that have actually received a higher ratio than 167, correct, synthetic substances?

MR. LUBIN: Objection, irrelevant.

THE COURT: Overruled.

THE WITNESS: Methcathinone is 1 to 380.

BY MS. LINEBERGER:

Q. One to 380?

A. Yes.

Q. For a cathinone?

A. Yes.

THE COURT: I don't understand this ratio thing. Do you want to take a shot at trying to explain to me why -- how the 1 to 167 is arrived at?

THE WITNESS: I don't have an answer for you, Your Honor. As I said, I looked for it and what I came up with is what, on page 11, the Sentencing Commission pretty much gave as their answer.

They discussed how they don't give out their data. They list most of it as proprietary, and they listed -- it is a few sentences on page 11. They said they look through many, many cases; they come up with a conservative value that many people may or may not agree with, and that's how they come up with their numbers. I don't have a definitive answer for you.

I know in some other instances, for example MDMA, there was a 2001 report to Congress. Congress -- I don't know what the word is -- asked the commission to give them a report on MDMA.

They took various factors into account; marketing towards youth, increased use around the country, neurotoxicity, various factors that went into finding their 500 to one ratio for MDMA.

Based upon that, you can't extrapolate that to synthetic cannabinoids, but I can only infer they didn't just look at a single number, that they looked into many factors in order to come up with what they thought was a reasonable and, according to them, conservative number for THC. Unfortunately, that's the best answer I can give you.

THE COURT: Okay, thanks.

BY MS. LINEBERGER:
Q. And they have -- the commission has said that THC should be at the 1 to 167 ratio.
A. That's what is listed in the sentencing guideline table.
Q. Moving on to the report, you have indicated that you have reviewed the Defense witness declarations, correct?
A. Yes.
Q. In your opinion, why isn't it acceptable to conduct clinical studies with any of the drugs listed in this case, especially XLR-11?
A. I have mentioned before, Your Honor, five of the eight substances in this case are currently schedule one substances. These are substances that the FDA has deemed have no medical use.

The substances in this case, many of them have published case reports demonstrating the serious adverse effects and/or deaths of the substances.

In my opinion, when a drug has no medical benefit, has serious adverse effects -- seizures, coma, and death -- it is inappropriate to -- for the purpose of court proceedings, to initiate a clinical trial just to see what is going to happen and put people at risk.

These drugs are toxins; they are abused for the psychoactive properties only. There is no medical benefit, and they cause serious reactions. It is unacceptable to do a

clinical trial with these drugs.

Q. So no human clinical studies, but there are the toxicology reports and the medical studies, correct?

A. Yes.

Q. And in the studies, were they able to exclude virtually every other cause of this illness or death -- of the illnesses or deaths?

A. No, not in all of the cases.

In some of the cases, there were instances of poly-drug use. Sometimes morbidity or obesity came into play.

In a large number of the cases, the synthetic cannabinoid was the sole cause of death. The cause of death will be listed as synthetic cannabinoid intoxication and, parentheses, due to XLR-11 or AB-CHIMINACA, for example, or PB-22, 5F-PB-22. There are not always clean cases with these drugs.

Q. Have you seen cases where the manufacturer, not China but the United States person that has obtained it from China and laced on vegetable matter, have you seen cases where they have actually combined multiple synthetic cannabinoids in their product?

A. That is quite common.

MR. LUBIN: Objection, irrelevant.

THE COURT: Overruled.

THE WITNESS: It is quite common to determine

multiple synthetic cannabinoids in the same package. There seems to be no rhyme or reason to what mixtures appear or why manufacturers.

That's something that I think only the manufacturer would know in terms of why one drug would be combined with various other ones or if the -- if it was leftover from the last batch, et cetera. I don't know, but in many cases, more than one substance is found in the package.

Q. Or they just don't care, right?

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

Q. Now, I'm going to direct your attention to Exhibits 15 to 22. Are these some of the published articles regarding synthetic cannabinoids and their adverse effects?

A. Yes.

Q. Have you reviewed them all?

A. Yes.

(Evidence identified as Government Exhibits 15 through 22.)

BY MS. LINEBERGER:

Q. Have prominent researchers also reviewed this data?

A. The data has been peer reviewed before being published, researchers have. I don't know if I can say they are all prominent.

Q. Are some of the writers prominent researchers?

A. Yes, some of them are very distinguished in their field.

Q. Well, let's go through them. Exhibit 15, would you tell

His Honor what the MM --

THE COURT: I can read them. If he wants to point to particular things in these articles, let's hear it, but let's not just go through them.

THE WITNESS: I can do them all in a minute.

THE COURT: Okay, please do.

THE WITNESS: Exhibit 15, the CDC puts out a MMWR weekly. This was the acute kidney injury, multiple patients exhibit kidney failure following ingestion of XLR-11.

In Exhibit 16, once again, this was an example of acute kidney failure following ingestion of XLR-11.

Exhibit 17 describes four postmortem cases wherein three out of the four cases, the cause of death was attributed to 5F-PB-22.

And in Exhibit 18, this study by Gurney, et al., this is more of a metanalysis, a collection of research over the past few years, exhibits the symptoms and adverse effects from a variety of drugs. Included in here, a lot of the JWH compounds, UR-144 and XLR-11.

In Exhibit 19, this was a more recent paper. You asked me before if more deaths had been reported on XLR-11, this one is recently published. This is a case report on two XLR-11 associated fatalities. The cause of death in both was XLR-11 or synthetic cannabinoid intoxication.

Exhibit 20, another kidney failure following the use

of XLR-11 and/or UR-144.

Exhibit 21, this is paper I first authored, the one I discussed in the Power Point from July of this year, describing various clusters of illness and synthetic cannabinoid related deaths. Twenty deaths were discussed briefly in that paper.

Lastly, Exhibit 22, this is a paper that just published in November. I was also part of this.

In Gainesville, Florida, in June of 2014, there was a cluster of overdoses in the Gainesville area due to AB-CHIMINACA. I assisted in determining the actual substance involved in the outbreak. Some of the clinical manifestations are also listed in the paper, and the drug was AB-CHIMINACA, one of the drugs in this case.

BY MS. LINEBERGER:

Q. And the period of time involved in this study listed in Government's Exhibit 22 was what period of time again?

A. That was -- it was Memorial Day weekend, so like May 29th to June 3rd, 2014.

Q. So these are recent articles, fairly recent, in the last year or so.

A. I think the oldest one might be from 2013. The Gurney paper is probably the oldest one; two or three years, max.

Q. So there is more data available now than there used to be about these particular substances, correct?

A. Yes.

Q. So just to recap, are the effects of marijuana anything like XLR-11 or the other synthetic cannabinoids in this case?
A. No.
Q. And based on studies, is XLR-11 at least as, if not more, potent than THC?
A. Yes.
Q. And is THC, as we stand here today, the most closely related substance in the U.S. Sentencing Guidelines list?
A. Yes.
Q. Did you find anything in the Defense declarations to suggest that there was even a basis to compare the XLR-11 and the other synthetic cannabinoids to marijuana?
A. No.
Q. Is there anything else that you would like to add on this subject, Doctor, at this time?
A. No.
MS. LINEBERGER: Thank you, Your Honor.
THE COURT: Okay. Why don't we stop for lunch. Forty-five minutes work for everybody?
MR. LUBIN: Whatever you say, Your Honor.
THE COURT: Well, I mean, can you eat in 45 minutes? I want to make sure everybody has time, but I also want to get to your witnesses.
MR. LUBIN: I appreciate that. Could we have an hour because I want to review the 22 exhibits, too, over lunch?

THE COURT: All right, an hour; 1:30.

MR. SCHELLER: Your Honor --

THE COURT: Yes.

MR. SCHELLER: It is a matter of someone in the galley. Can we just approach sidebar?

THE COURT: I don't want to do sidebar. What is the problem?

MR. SCHELLER: Your Honor, it is -- I just would prefer if we could just approach very briefly.

THE COURT: I'm not --

MR. SCHELLER: Well, okay.

THE COURT: If you can figure out how to tell me the problem, but I don't do sidebars in sentencings.

MR. SCHELLER: All right. Well, I have -- I have -- I don't want to embarrass her, but I have a person in support of my client who wears a hijab, and she was told downstairs that she had to take it off in the courtroom. She is a Muslim.

THE COURT: I will ask them to honor her religious position.

MR. SCHELLER: That's all.

THE COURT: The CSOs downstairs, is that where it is?

MR. SCHELLER: Your courtroom deputy.

THE COURT: Will you guys communicate, somebody ought to be able to wear their religious garb.

MS. LINEBERGER: If I can correct the record,

Mr. Lubin said he needed to review the 22 exhibits, a number of these exhibits, he has already had.

THE COURT: The only point was how long we are taking for lunch. We are taking an hour, 1:30.

MS. LINEBERGER: Thank you, Your Honor.

(Recess was had at 12:32 p.m.; and the proceedings resumed at 1:26 p.m.)

THE COURT: Okay, please have a seat.

Is everybody here?

MS. LINEBERGER: Yes, Your Honor.

THE COURT: Okay.

MR. SCHELLER: Judge, we worked out that situation, it was a third party.

THE COURT: I hear it wasn't a CSO.

MR. SCHELLER: We addressed it and appreciate the Court's input, I just wanted to let you know.

THE COURT: All right.

And you are going to cross-examine, rather than put on your expert, is that where we are now?

MR. LUBIN: What I would like to do, if the Court would accommodate, is I would like to put our expert on and do my cross later, just so I can get him to the airport.

THE COURT: No, that's all right. Make sure you leave time for her to cross, too, of your expert.

I don't have a problem with that, if you want to do

your cross later.

Do you have any problem?

MS. LINEBERGER: Actually, I believe they found a later flight for the witness, according to Mr. Scheller, so I would prefer the continuity of the way it normally goes as opposed to upsetting the normal course of affairs.

THE COURT: I really don't care, as long as you -- if you are worried about your fellow getting out of town and this one --

You may have a flight, too.

DR. TRECKI: I do, Your Honor.

THE COURT: When is yours?

DR. TRECKI: Late, I accounted for --

MR. LUBIN: When is your flight?

DR. TRECKI: 8:00 p.m.

THE COURT: Your guy has a later flight?

MR. LUBIN: We don't know if there are seats. Right now, he has a flight that leaves at 4:55.

THE COURT: But he doesn't know if he has a seat on a second one?

MR. LUBIN: There is a later flight at 7:00.

THE COURT: Do you have seats on it or not, you don't know?

Put him on, so we make sure people get their flights.

MR. SCHELLER: I'm sorry, we didn't have seats then.

MR. LUBIN: So you will put him on.

MR. SCHELLER: Yeah, we were trying to put him on a later flight.

THE COURT: I don't have a problem with the continuity issue. We don't have a jury. As long as both sides get their chance to cross-examine, I can figure out who is on which side.

DR. TRECKI: Your Honor, may I ask a question?

THE COURT: Yes.

DR. TRECKI: Because I'm still on the stand here, am I allowed to confer with --

THE COURT: You all don't have a problem with that, do you? I mean, we are -- the rule doesn't have a lot -- make a lot of sense with experts. Do you have a problem with him being able to confer?

MR. LUBIN: I don't mind if he confers with her about his testimony, that's all. If he wants to talk about what he is observing --

THE COURT: You probably want to talk about the other expert, is that what you want to talk about?

DR. TRECKI: Yes, sir.

Step down?

THE COURT: Vice versa, too. I mean, both you all, we are interested in your expertise and your opinions, not

necessarily the facts.

MR. SCHELLER: I am just going to use the Elmo for this person, Your Honor.

MS. LINEBERGER: Can we have a moment to switch electronics, Your Honor.

THE COURT: It doesn't take long, she just pushes a button usually.

MS. LINEBERGER: They need my computer off of it and theirs on it.

MR. LUBIN: While they are playing around, I know there was some discussion about --

THE COURT: Yeah, I'm not really happy about January. You guys don't have any time either next week or the following week?

MR. LUBIN: Two of us are on vacation one of those weeks, and two of us are on vacation the other of those weeks.

THE COURT: All right. I'm not going to mess with your vacations. So next -- the week after this coming one, the week beginning the 21st, somebody is on vacation?

MR. LUBIN: The week beginning the 21st --

MR. SCHELLER: Two.

MR. SHINER: Two of us.

MR. LUBIN: -- two of them are on vacation.

They are all in custody.

THE COURT: I recognize that, but there is an

advantage to getting things finished, especially when things are fresh in your mind and you are dealing with it, because once you move on to another thing, you move on to another thing, in my experience. You have a better memory than I do.

MR. LUBIN: I don't know about that. I'm not sure about that at all.

THE COURT: Are you ready?

MS. LINEBERGER: Oh.

THE COURT: Did you move whatever you had to move?

MS. LINEBERGER: I moved it, yes, Judge.

THE COURT: Good, let's start.

MR. SCHELLER: Thank you very much.

Your Honor, Mr. Hossain would call Dr. Nicholas Cozzi to the stand.

DR. NICHOLAS COZZI, PH.D., DEFENSE WITNESS, SWORN

THE COURTROOM DEPUTY: Please state your full name and spell your name for the record.

THE WITNESS: My name is Nicholas Cozzi, C-O-Z-Z-I.

DIRECT EXAMINATION

BY MR. SCHELLER:

Q. Good afternoon, Doctor.

A. Good afternoon.

Q. Doctor, I just want to go quickly through your background.

A. I'm a professor at the University of Wisconsin School of Medicine and Public Health.

Q. And did you prepare a declaration in this case?
A. I did.
Q. Okay. And to the best of your knowledge, are the statements in that declaration true and accurate?
A. Yes, they are.
Q. Did you also provide a CV in this case, a curriculum vitae?
A. I did.
Q. Are the statements in that CV, curriculum vitae, true and accurate to the best of your knowledge?
A. Yes, they are.
Q. Okay. Would you discuss just briefly your education and background in pharmacology.
A. Yes. I have a bachelor of science degree in pharmacology and toxicology from the University of Wisconsin at Madison, and I have a Ph.D. degree in pharmacology, also from the University of Wisconsin in Madison.
Q. And do you -- as part of your experience in pharmacology do you conduct research?
A. I do.
Q. Can you describe your research, what does that research involve?
A. Well, my research involves both the chemical synthesis and pharmacological examination of drugs, mostly drugs with psychoactive properties.
All of my research has been focused on drugs that are

called hallucinogens, drugs that are stimulants, and drugs that are antidepressants. I synthesize these drugs in my laboratory; sometimes these are new compounds; sometimes they are existing compounds, and then we test them in vitro and in vivo.

Q. Let me ask you --

I think there is something -- I'm getting a little bit of static. Do you mind adjusting --

A. How is that?

Q. All right, thank you.

You said you synthesize compounds in your laboratory. For what agencies do you synthesize these compounds for?

A. I have supplied some materials to the National Institute on Drug Abuse, in particular, a series of cathinone compounds, methylone, MDPV. I work closely with some colleagues at NIDA, National Institute on Drug Abuse.

I also synthesize compounds for clinical trials around the United States. In particular, we have been working with psilocybin, which is a schedule one substance, but it is currently being tested in human beings at various academic institutions around the United States, including New York University, Johns Hopkins University School of Medicine, University of Alabama, UCLA, University of Wisconsin, University of New Mexico, so I'm involved in numerous clinical trials as well.

Q. Let me -- I'm confused, then, because you just said you are synthesizing a schedule one substance for use in these different testing.

I thought that Dr. Trecki had testified that you couldn't do medical -- you couldn't do testing with schedule one substances because of the dangers associated with them. Is that correct?

MS. LINEBERGER: Objection, mischaracterization of Dr. Trecki's testimony, Your Honor.

THE COURT: Overruled.

A. Well, so as Dr. Trecki mentioned, schedule one substances are deemed to have no medical use; however, that does not preclude their investigation in research.

In fact, as I mentioned, I'm personally involved in some of this research, and there are at least 14 ongoing or completed clinical trials involving the substance psilocybin right now in the United States.

MS. LINEBERGER: Objection, irrelevant, Your Honor, that's not one of the substances used in this case.

THE COURT: Overruled.

MS. LINEBERGER: And it has nothing to do with THC, Your Honor.

THE COURT: The objection is overruled.

BY MR. SCHELLER:

Q. During the testimony, the -- I also wanted to clarify

something about related chemicals and so on. You said you had worked with cathinones and methylones and so on?

A. Right.

Q. Is the XLR-11 in this case a cathinone?

A. No, it is not.

Q. So it is not a bath salt, right?

A. Well, bath salts is kind of a colloquial term applied to these cathinones; and no, XLR-11 is not considered a bath salt.

Q. Okay. All right, I just wanted to clarify that. Thank you.

Have you testified as an expert before?

A. Yes, I have. I have testified both at the county level, the state level, and the Federal level in various cases before.

Q. Okay. And what type of subjects did you testify about in Federal court, just generally?

A. Well, I have testified about hallucinogens; I've testified about stimulants, bath salts; I have testified about synthetic cannabinoids.

I have also testified in simply medical malpractice cases involving drugs that are not controlled substances, that are not necessarily psychoactive, but yet fall under my purview as a pharmacologist.

Q. What were you asked to do in this case?

A. I was asked to evaluate the chemical and pharmacological

literature on a series of synthetic compounds.
Q. Did one of those compounds include XLR-11?
A. Yes, it did.
Q. Okay. As the -- did you review the presentence report in this case?
A. I did.
Q. Do you agree with the assertion that XLR-11 is a synthetic THC?
A. No, I don't.
Q. Generally, what were your conclusions in this case?
A. Well, my conclusions, after reviewing the literature with these compounds, is that there have been some studies performed with these compounds, mostly in vitro studies, some in vivo studies using rats or mice; however, I couldn't find any human studies involving XLR-11.
Q. Well, let's go through that, then.
THE COURT: You said the PSR suggests that it is a synthetic THC.
MR. SCHELLER: I believe so.
THE COURT: I guess I didn't read it that way. I thought our task was to figure out which of the guidelines drugs XLR-11 most closely approximate.
I'm also then interested in whether that guideline is relevant or makes sense to this case, but then -- and then, third, also the dangers of XLR-11 with respect to the need for

deterrence. Those are the three areas.

I didn't understand that there was some argument that this is the same -- that this is a synthetic version of that drug.

MR. SCHELLER: In any event, we are going to address each one of those areas, Your Honor, today.

THE COURT: Okay, great.

BY MR. SCHELLER:

Q. So there hasn't been any studies of XLR-11 in human beings.

A. No controlled studies, no.

Q. And as you mentioned, there have been studies with the XLR-11 with animals or in --

A. Yes.

Q. Okay. And can you describe for the Court your experience with animal studies?

A. Well, I personally have conducted drug discrimination assays as part of my Ph.D. work, and I published paper in this area, so I'm well familiar with the methodology and also its limitations.

Q. You have actually then done -- when you say you have done discrimination studies, can you explain to the Court what exactly those studies entailed.

A. Yeah. So as I think Dr. Trecki outlined earlier, a drug discrimination study essentially asks an animal, is this -- does this new drug resemble a drug that you have seen before,

really that's the bottom line. And so animals are trained to discriminate or distinguish a drug from saline, an inert vehicle; and once an animal has learned to make that distinction, you can then administer an unknown drug and see if the animal responds as if this were the training drug or not, and that's the basic approach in drug discrimination assays.

Q. Can you explain mechanically how it actually works with the discrimination study? Are there levers that are used?

A. Yeah. So the animal is presented with two levers on which to make a choice and one trains the animal to press one lever, let's say, the left lever, if one has injected saline, and then trains the animal to press the right lever if one has administered the training drug, for example THC.

And initially, you reward the animal if they press the lever even once. But generally, this training takes a period of time; and generally, what one does is increases the number of lever presses required for a positive response.

So in our work, we established what is called a fixed ratio of 50, FR50. So the animal had to press the lever 50 times to give confidence that what it was responding to was either the saline or the training drug. Initially, you start much lower, but you keep raising the bar.

So if an animal -- suppose an animal is trained and one administers drug X, and the animal presses the saline lever

50 times, you are pretty confident that it is interpreting this drug as if it were saline. On the other hand, if it presses the other lever 50 times, then you are pretty confident that the animal is interpreting the effect as if it were, say, THC.

So we use a FR50. It is a much more rigorous and robust approach than some of the studies I saw which only use an FR10, so these animals only had to press the lever ten times. This lowers the bar and increases the likelihood that one will get a positive response.

Furthermore, our threshold for correct responses was an 85 percent threshold. The animal had to recognize either the saline or the training drug 85 percent of the time, which is a pretty high threshold. In the studies I reviewed, the threshold was only 80 percent. That also increases the likelihood of getting a positive response.

Thirdly, in our studies, we use 10 to 15 animals to give us a robust and confidence in the results. In the studies I reviewed, the animals -- used only six animals. So again, it is a little bit -- it is not quite as robust, not to say that those results may not be true. It's just that in my experience, we used -- we kind of set a higher threshold for reaching a conclusion.

Q. You keep on referring to the studies that you looked at. You are referring to the studies with XLR-11 in this case?

A. Yes. I'm referring to the studies in particular by Gatch

and Forster, 2014 and 2015, which looked at both THC and a number of synthetic cannabinoids, including XLR-11.

Q. When you were referring to the studies you did, can you just explain briefly for the Court what substances you were doing the animal discrimination test?

A. Yes. We trained our animals on LSD, amphetamine, MDMA, MDMA like compounds, and a variety of compounds. We had approximately 30 different sets of animals that could discriminate 30 different drugs.

MS. LINEBERGER: Objection, none of those drugs are in this case, Your Honor, nor are they synthetic cannabinoids.

THE COURT: Overruled. And as I mentioned to Mr. Lubin, cross-examination may be the best place for this rather than continued interruption with objections.

MS. LINEBERGER: Yes, Your Honor.

BY MR. SCHELLER:

Q. You were referring -- I put it in front of you -- this is from the Government's Power Point. You were referring to the studies. Is this Gatch and Forster?

A. Yes. This is Gatch and Forster, 2015 study comparing the effects of THC with a series of synthetic compounds, including XLR-11.

Q. Now, can you explain -- I was a little bit confused. Can you explain to the Court, actually for me, what the ED50 value means?

A. ED50 value is the dose required to get 50 percent of the animals to respond, so it's a commonly used benchmark in pharmacology.

It's -- in this case here, it is milligrams per kilogram. So if you look at THC, for example, if you administer 0.85 milligrams per kilogram of THC in this study, 50 percent of the rats; i.e., three out of the six, would respond on the THC lever, and three of them would not respond.

Q. So you have -- so this study and this correlation between XLR-11 and THC is based on the fact that three rats may have shown a positive?

A. Well, it's more than three, but the ED50 is chosen as a convenient landmark, if you like, or benchmark so that we can compare drugs across different studies, for example.

So in other words, you want to -- if a drug has an ED50 in one study, then you can look at another study and look at what the ED50 is there and see whether they are comparable.

Q. Now this study from Gatch and Foster (sic), if you look at the bottom, it was done in August of 2015.

A. That's when it was published, yes.

Q. Okay. And you heard the testimony about how these are reliable testers and stuff, so on. Are you familiar with Gatch and Foster (sic)?

A. Yes, I am.

Q. How so?

A. I have read their work, I have used their work. I have cited their work in my own work.
Q. And have you looked at any other studies done by them with THC and XLR-11?
A. Well, this is the only study I'm aware of that includes XLR-11. However, I have looked at other studies they have done involving THC.
Q. Okay. Now --
THE COURT: It is suggested that this also shows that -- and I may have it wrong, but the potency of XLR-11 is greater than THC, according to this. Is that the case?
THE WITNESS: Yes, I would agree with that.
In this study, in this publication, the potency of XLR-11 is more potent than THC because that number is lower, that .18, or whatever it was, is lower than .85.
THE COURT: But was your problem then with the study that you thought some of the parameters they had weren't as rigorous as the ones you used, is that what I understood?
THE WITNESS: That's one issue I have, but I looked at an earlier study they did.
If you can zoom in on this paper here.
BY MR. SCHELLER:
Q. This is 2014 study from Behavioral Pharmacology.
A. Yes. It is a little bit out of focus.
So this is a study by the same --

MS. LINEBERGER: I'm sorry, Your Honor. I don't know where Counsel got that document from, and perhaps it should be made an exhibit or something, so the record is clear.

MR. SCHELLER: I'm sorry. This is from article from Behavioral Pharmacology, the same publication that you took your Power Point from. It's 2014, and it is by Foster (sic).

THE WITNESS: It is Gatch and Forster.

MR. SCHELLER: And I believe --

MS. LINEBERGER: May I see it, please?

MR. SCHELLER: Yes. And I believe your own expert has referred to it in some of his prior declarations.

MS. LINEBERGER: I'm sorry, Your Honor, but I didn't have a copy, I have to review it with -- may I have a moment, Your Honor?

I'm sorry, Counselor, it is not the same. This is Behavior Pharmacology 2014, Volume 25, Number 8, and the slide comes from Behavioral Pharmacology 25, August, 265:460-8.

I would like the record to reflect they are not the same, Your Honor, and I do not have a copy of this exhibit.

There you are, sir.

MR. SCHELLER: Do you have an extra?

(Pause in proceedings.)

BY MR. SCHELLER:

Q. Is this the study you were referring to?

A. Yes.

Q. And this is one of the other studies you reviewed?
A. Yes.
Q. Okay. And where did you review this study -- I mean, when did you review this study?
A. I reviewed the study in preparation for my testimony.
Q. Okay. And was this study, was this conducted by the same two individuals, Gatch and Foster (sic)?
A. Yes, it was.
Q. And what is the drug discrimination value for THC?
A. Here, it is 0.56.
Q. Okay. Let me go back to the Government's Power Point.
What is the drug discrimination value for THC in this study?
A. Here, it is 0.85. It is roughly 152 percent greater than the previous study.
Q. And this significant difference, how does that affect your analysis of these studies?
A. Well, it diminishes my confidence in their approach because it is the same two people using the same kind of animals in the same assay, in the same laboratory, testing THC and coming up with two completely different values for the ED50.
And so this made me question how one could extrapolate potency of THC or any other drug, for that matter, from this laboratory into a human effect. Their results are not reproducible.

THE COURT: Can you put your other one back up a minute. It also had an XLR-11. I was trying to figure out --

MR. SCHELLER: It has the some other cannabinoids, Your Honor. It has the THC --

THE COURT: Oh, it doesn't have the --

MR. SCHELLER: No, but this was done in 2014. It is the same table, same researchers, and the THC value is .56.

BY MR. SCHELLER:

Q. So can you make -- do you agree with Dr. Trecki's conclusion that you can make conclusions about XLR-11 potency in human beings based on these studies with rats?

A. No.

Q. Why not?

A. Well, we just saw that the data is highly variable. And because it is not even reproducible by the same group, I don't have confidence in extrapolating that data even to another species, let alone a human being.

If I may, I also reviewed some studies in mice using THC in a drug discrimination paradigm, and some of these mice studies were referred to earlier. And here, we have an ED50, this is studies by Wiley in 2013 and 2015 where, in mice, the ED50 was 1.4 and 1.5 milligrams per kilo, again very different from the ED achieved in rats; and therefore, it calls into question whether this data can be extrapolated into what the drug will -- what kind of dose, what kind of potency, what kind

of effect the drug will have in a human being.

The drugs don't even produce a same effect at the same dose between rats and mice, let alone humans -- well, for humans, we don't even know.

BY MR. SCHELLER:

Q. Can you talk about, in your experience, whether -- how well studies in animals translates to studies in humans with chemical substances or medications or whatnot.

A. Well, animal studies are commonly done in the drug discovery process. In fact, I understand that they are required by the Food and Drug Administration, as are human studies, before a drug is approved.

But the experience of the drug industry is both that the in vitro studies and the vivo animal studies are not reliable predictors of what a drug will produce in a human being. In fact, there are data that over 90 percent of drugs which enter the research pipeline fail when they reach the human being.

Now, sometimes they fail in the in vitro phase, sometimes they fail in the animal phase; but these are the numbers. These are well established, well accepted numbers that more than 90 percent of chemical entities that are seen to be promising in vitro, promising in vivo nevertheless fail to be approved.

THE COURT: Let me ask you. What would -- why would

you -- it seemed to make sense that if it has no medical value, you wouldn't test it on humans. Why is that not a -- I guess why wouldn't I accept that?

THE WITNESS: Well, Your Honor, we don't know --

THE COURT: What would be the point of testing something with no medical value on humans?

THE WITNESS: We don't know if it has medical value until it has been tested in humans. In other words, it is a circular argument to say it has no medical value; therefore, it has no medical value.

THE COURT: So you are saying that the fact that it has been approved by the FDA is not a reason why you would not -- that you would -- the fact that it has not been approved by the FDA for medical purposes is not a reason to have human testing.

THE WITNESS: Yes, exactly.

THE COURT: All right.

BY MR. SCHELLER:

Q. Well, you heard about the -- you heard about the drug Marinol, right?

A. Yes.

Q. And that is a compound that has THC?

A. Yes.

Q. Okay. And that was actually tested on humans?

A. Yes, it was.

And if I may, there are synthetic cannabinoids that have been tested in humans. So the drug nabilone, which is actually a prescription drug, is a synthetic cannabinoid and it's been tested in humans, and the brand name is Cesamet, and it is approved by the FDA to treat nausea and vomiting and approved to treat pain.

So there is precedent for the testing of synthetic cannabinoids in human beings for a hope for medical benefit.

Q. Thank you.

MR. SCHELLER: Did that answer your question?

THE COURT: Yes.

MR. SCHELLER: Okay, thank you.

BY MR. SCHELLER:

Q. And just to sum up and move to the next area, what was the limitation of using a -- of relying on a two-tier discrimination study in this case to conclude that XLR-11 has the same effects and potency as THC?

A. Well, the limitations are it hasn't been tested in humans, so we don't know how XLR-11 compares to THC in human beings. We don't know what dose of XLR-11 would mimic THC in a human being, if that is its intended purpose.

The other limitation I think I already outlined is that these animal studies do not reliably predict the response in human beings.

Q. Now, going -- I want to talk about the effects. You heard

1 Dr. Trecki say that XLR-11 had the same effects as THC.
2 What is the limitation in Dr. Trecki's conclusion
3 that XLR-11 has the same hallucinogenic effects as THC?
4 A. Well, THC is not classified as a hallucinogen by any drug
5 categorization that I'm aware of. Hallucinogens are substances
6 such as LSD, mescaline, peyote, psilocybin, also called
7 psychedelic agents, which I have done some work with. So it is
8 a well-defined category. So that's one limitation.
9 Now, that's not to say -- and I gave some examples in
10 my declaration that some drugs, under some conditions, can
11 cause hallucinations, absolutely true. Certain prescription
12 drugs are well-known to produce hallucinations in some people,
13 but they are not correctly classified as a hallucinogen. And
14 so, if we are looking at a side effect, that's not really the
15 indication for which the drug is used.
16 If you look at the indications for Marinol, for
17 example, it is indicated to treat the -- as an appetite
18 stimulate and it is used as an antinausea drug. It is not
19 prescribed as a hallucinogen; nevertheless, it may produce
20 hallucinations, and so that's, I think, the distinction that we
21 are making here.
22 We don't know what XLR-11 -- whether it might have
23 any medical benefits, whether it might have analgesic affects,
24 antinausea effects, other effects associated with THC. All we
25 know is from some anecdotal reports that people took an unknown

amount of this substance and had adverse reactions.
Q. Let me just concentrate on that. You said all we know is some individuals, you know, may have had adverse reaction with XLR-11. Did you see any studies showing the total number of users of XLR-11 in the United States?
A. No. I don't know how many.
Q. Did you see any of that -- those figures in Dr. Trecki's work, giving the total number of XLR-11 users in the United States?
A. No, I did not.
Q. Okay. So we have no idea -- as far as you know, there is no studies establishing the percentage of XLR-11 users who have had adverse effects.
A. No. I don't know how you could quantify that number because I can find no data on the actual number of XLR-11 users.
Q. These anecdotal studies, did you review some of those articles and materials?
A. I did.
Q. And did you see limitations in the use of those -- trying to use those articles?
A. Well, yes, I did. I mean, these are case reports, coroners' reports, sometimes a drug is detected after a traffic accident or other circumstantial things occurred and the drugs were detected, XLR-11 and some of the other substances I heard

about.

But some of the limitations are, especially with respect to the adverse effects, that we don't really know the physical health of the persons who had the adverse effects. So it is known, if you have a preexisting condition, you may respond -- you may have a much greater than intended effect in taking a drug, not just XLR-11, THC, really any prescription drug. So that wasn't controlled for.

These are post hoc analyses, postmortem, or following some other incident, and so we don't know what other drugs these people were on.

I do know, in one of the studies, I noted that they detected diphenhydramine, which is Benadryl, in one of the people's blood, and so we don't know if there is drug-drug interactions that may cause an adverse effect.

I mean, I'm not, you know, trying to say that there may not be adverse effects associated with these drugs, there likely are. Everything produces an adverse effect at some dose.

Q. Okay. Let me concentrate on that. You said everything produces an adverse effect in some dose. Can you expand, give me specific examples?

A. Well, you know, Tylenol, I mean, you know, a commonly taken dose is usually well tolerated in people, but if you take too much, it can cause liver toxicity.

Lipitor is a drug that's in the whole class of so-called statins. These are drugs used to treat cholesterol, produced rhabdomyolysis, one of the conditions Dr. Trecki testified to earlier. This is a wasting of the muscles and kidney failure in some people, and the drug has to be discontinued.

So there are many examples of drugs in the literature, and I couldn't go through them all, listing adverse reactions. But if I might, 500 years ago, Paracelsus stated, "The dose makes the poison," and that's as true today as it was 500 years ago, so it is always dose related.

And with respect to some of these case studies, we don't know how much these people took. And so, I mean, that's one of the concerns I have with kind of painting with a broad brush, with over-interpreting the data and saying that these drugs, without fail, are going to cause these adverse reactions. We don't know that because we don't know what -- the doses that they took.

Q. Also, besides doses, you also don't know if they were taken in conflict or subverse effects with other medications, like Benadryl.

A. Right. There could be drug interactions, there could be physiological reasons. There are several reasons why some people might respond. It may be a small fraction, but they will, nevertheless, gain attention if they are admitted to an

emergency room or die.
Q. Well, when we talked about studies -- when Dr. Trecki talked about these studies using these anecdotes and these reports and these autopsies and so on to show adverse effects in human beings, is that an appropriate -- can you make such a conclusion based on that information that he refers to?
A. I'm not sure what you are asking.
Q. Can you say -- make conclusions about XLR-11 is going to have this effect in human beings based on the information that D. Trecki referred to; the autopsies, the stories, the anecdotes, and so on?
A. You can't generalize, no. The answer is no because that requires a generalization.
All we know is that these particular data, these particular cases showed an adverse effect, but we don't know how much drug they took, we don't know what other drugs they were taking, we don't know their physiological state, so it is inappropriate to reach a conclusion about the specific compound.
Again, I'm not saying that the drug may not have adverse effects at some dose, as all drugs do, but there might be a dose where it has beneficial effects.
Q. Did -- can you use the two-tiered prong discrimination study that was used in this case with the rats to make a conclusion that XLR-11 would have the same hallucinogenic

effects as THC?
A. No.
Q. Use just an animal study?
A. No.
Q. I want to switch.
And so just to sum up -- just to sum up, we do not know what percentage of people who use XLR-11 have adverse effects.
A. No, we don't. It is impossible to know what fraction of people would consume XLR-11 and actually have an adverse effect.
Q. I want to turn to -- we heard --
THE COURT: Why is that any different? Do we know that for cocaine, or heroin or oxycodone?
THE WITNESS: We do for some of those. For example, oxycodone is a prescription drug and we know how many people are prescribed that drug and how many take that drug and that pharmaceutical companies monitor adverse effects. So it is possible to get a number and say, Well, 3 percent report nausea and vomiting or 5 percent report dizziness, because we know how many the -- how big the population is.
With these substances that we have been discussing, we don't know how many people are taking those. It could be tens of thousands, it could be millions, I don't know. And so, it's not possible to get the percentage exhibiting an adverse

effect without knowing that number. It is mathematically impossible to do.

THE COURT: So then what -- how do you approach the problem?

THE WITNESS: Well --

THE COURT: I mean --

THE WITNESS: Controlled --

THE COURT: Two things we need to do here are, one, figure out which of these drugs in the drug equivalency table is closest to XLR-11, whether it is THC or marijuana or cocaine or whatever, and once you figure out which one is the closest, I guess you would examine how relevant it is to a sentence.

They say that one gram of synthetic THC is the equivalent of 160 grams of marijuana. How do you arrive at what is an equivalence?

And then I guess, finally, if there are people dying or getting -- or having serious injuries as a result of this and you want to have a deterrent to it, what level of deterrence do you impose?

Those are the -- I'm not going to solve -- I can't solve this scientific issue that you raise, and you point to some problems with their analysis, but I wonder what the solution is.

THE WITNESS: Well, you know, I think it's important to -- for any drug to establish some sort of safety profile,

1 but that's always going to be dependent on the dose; and so
2 absent a controlled study, I don't know how to answer that.
3 I mean, there needs to be, you know, a pharmaceutical
4 company that is interested in developing one of these agents as
5 a pharmaceutical. It costs millions of dollars to do these
6 kinds of studies I'm talking about, but I think to the point of
7 this is that we are just interested in getting at the science
8 and the truth.
9 I'm not putting that into my equation, the cost of
10 it. I'm just kind of speaking from a purely pharmacological
11 point of view, scientific point of view, this is what has to
12 occur. Without that, it is kind of guessing, basically.
13 BY MR. SCHELLER:
14 Q. We do have a study with six rats, though, we can rely on
15 that.
16 I guess --
17 THE COURT: You and Ms. Lineberger must have learned
18 questions in the same law school. Kind of like --
19 MR. SCHELLER: I was going to ask --
20 THE COURT: -- the anything question and the rat
21 question kind of resemble each other.
22 MR. SCHELLER: You know, I was going to ask to strike
23 what I just said, Your Honor. You beat me to it.
24 BY MR. SCHELLER:
25 Q. So you heard the Judge had -- the Court -- Honorable Court

had an interesting question there at the end. I want to talk about that ratio, and then we are going to circle back to a couple of things. That's in the Judge's mind and now it is in mine.

Let's talk about this 1 to 167 ratio. Under the guidelines, are you aware that THC -- one gram of THC under the guidelines equates to 167 grams of marijuana?

A. I am.

Q. Okay. And let's deconstruct that. Do you think that is a reliable or scientifically based ratio?

A. I don't think it's based on science. I don't know where that number came from. Believe me, I have searched high and low, and I don't know where that number came from.

Q. Okay. But is there any other reason why you don't? Do you think it is a fair ratio, do you think it is a reliable ratio?

A. No, I don't, and I would like to explain why.

Saying that one gram of THC is equal to 167 grams of marijuana is like saying 167 grams of marijuana contains a gram of THC; that's what that equivalence means.

But if you calculate what percentage of THC that is on the weight, you take the one you divide it by 167, you get 0.6, so 0.6 percent of the total weight is THC. That's completely unrealistic in terms of psychoactive marijuana.

We know from Government studies that the average THC content in marijuana today is over 14 percent, so the ratio

should be 1 to 7, not 1 to 167.

Cannabis or marijuana that has a THC content of 0.6 percent is also known as industrial hemp. It is used to make hemp cloth, hemp fiber, hempseed oil. It is industrial hemp, it is not psychoactive marijuana.

You know, it is also called ditch weed. It is something that people don't commonly, to my knowledge and from reading the literature, use for its psychoactive purposes.

So this 1 to 167 is far off the actual THC content of marijuana, and that's why -- you know, so I looked to see where did this number come from, and I can't find it to figure out why, and I made some statements to that effect in my declaration.

I went through the math and I used the research provided by the U.S. Government's marijuana farm at the University of Mississippi, and they publish THC content of seized cannabis going back to 1993, and the latest data I had were from 2008, but there is a continual escalation in -- and I understand that in Colorado, which is a medical marijuana state, and actually any kind of marijuana -- 20 percent is considered medical, so that would be 1 to 5, it would be a 1 to 5 ratio.

I hope I'm making myself clear.

THE COURT: You are saying that if -- XLR-11, if you treated it as pure THC, then it would be 1 to 7 --

THE WITNESS: Yes.
THE COURT: -- would be the appropriate relationship?
THE WITNESS: Yes, exactly.
THE COURT: And if it was medical --
THE WITNESS: 1 to 5.
THE COURT: So you don't know any scientific reason for it to be so much higher?
THE WITNESS: It is wildly inaccurate.
BY MR. SCHELLER:
Q. You said you can find it in hemp and in industrial hemp products. Those are actually products you can buy legally, correct?
A. Yes.
Q. And those would have a -- again, those would have the same THC or more THC than the 1 to 167; is that right?
A. Anything under 1 percent is classified as industrial hemp.
Q. Okay.
A. And so this is like -- you know, hemp oil, I mean, you can buy this in health food stores.
If I may --
Q. Yes, sir, please.
A. So if I could use an analogy, it is like if you look at the morphine content in opium poppy seeds, to be sure there is opium in a poppy seed, but poppy seeds are not considered psychoactive. I mean, they are used as a condiment, they are

used in baking and so on, and it is exactly the same analogy here. The poppy seed is industrial hemp essentially.

Q. Thank you.

To your knowledge, were there any studies of six rats and poppies seeds?

A. No.

Q. All right. So you heard the assertion that the adverse side effects of XLR-11 are worse than THC. Do you agree with that conclusion?

A. Well, it depends -- it is dose dependent, so I can't really go anywhere with that. It depends on the dose.

There will be some dose of XLR-11 that is completely inert, and there will be some dose that produces maybe one of the effects, and then another dose that might produce two or three or four of the effects. Adverse effects are always dose dependent.

Q. Let me rephrase it, it was poorly phrased.

Is there enough studies or literature to support the assertion or the claim that the side effects of XLR-11 are more adverse or worse than THC?

A. No.

Q. Let's go back and then I want to finish up with a couple of things.

THE COURT: Let me ask you, before you get to that.

Do you agree with the assertion that some of the

ingredients in marijuana are salutary or ameliorative to the THC, if it is within the drug?

THE WITNESS: Yes. I agree that some of the other substances in marijuana may modify the effects of the THC.

In fact, this is known in the industry as entourage. It is an entourage effect. So many people using medical marijuana actually seek different strains because they have different profiles, different ratios of these other cannabinoids, and so one strain may be a better antinausea strain; another may be more as a sleep inducer or antispasm. And so it is known that these other cannabinoids of which there are 60, 70, 80, may well interact and modulate the effects of THC by itself. I completely agree with that.

BY MR. SCHELLER:

Q. But there has been no such testing on XLR-11 to determine if it has such effects; is that accurate?

A. Not to my knowledge.

Q. Let's go back to the drug discrimination, because you had talked about your own experience with the discrimination test.

Can rodents or mice or rats, can they be tested to discriminate between three things?

A. Yes, they can.

Q. So could they have used a test, for instance, with XLR-11 that would have had the rats discriminate between THC, XLR-11 and the saline solution?

A. Possibly, yes.
Q. Okay. And is the three -- the discrimination using the three -- I guess three levers?
A. Three levers, yes.
Q. Is that more effective or more reliable?
A. Yes, it is, if one is able to tease out nuances or differences in the discriminative queue, whatever the animals are responding to.
So if you only have two choices, it is only a yes or no; but with three choices, now you can get at -- you can tease out sometimes other effects. It has been used with several drugs.
Q. So when you use the two-lever test with the rats or the mice with XLR-11, the fact that they may -- they may be hitting the lever for THC for other reasons, other than hallucinogenic effect, right?
A. Right. So I would point out that the training doses used in these animals are on the order of 3 milligrams per kilogram, a significant dose.
If the ED50 is less than a milligram per kilo, .85, .86, whatever day of the week it is, but they are training them at a dose that's fourfold higher than that, it is unclear really what they're responding to.
Are they responding to the same feelings that a human being would feel; don't know. All we know is that they

respond. They are responding to something. It is making them feel something, but we don't know what that is.
Q. Right. And the saline, when injected, they really feel nothing with the saline?
A. Yeah, right.
Q. In going through, the Court had asked, trying to figure out which substance listed on the -- under the drug guideline would be the most similar to XLR-11. What would your conclusion be?
A. You know, I don't want to be faced with that task because I don't know what it is most similar to.
I mean, I looked at the sentencing guidelines. It includes many different drugs; amphetamine, cocaine, et cetera, et cetera, and I -- you know, it is kind of we are tasked here with a square hole and it's like our peg is maybe, you know, an octagon, and it is like, Well, does it fit this hole; not really, but it fits this one a little more closely. So I don't really know what I would assign it to.
I do know it certainly binds the cannabinoid receptors. It does some in vitro things like other cannabinoids do, so that kind of suggests like a hypothesis I could test. And it may well be the closest, I'm not saying -- I can't rule that out, but I also can't rule it in.
Q. Okay.
MR. SCHELLER: One moment, Your Honor.

BY MR. SCHELLER:
Q. Is there anything else that you wanted to add before I step down?
A. No.
MR. SCHELLER: All right.
Thank you, Your Honor.
THE COURT: Let me ask you a question. It may be so broad, it defies an answer. I'm trying to find out how to compare some of these drugs.
I understand what you are saying by trying to pick an equivalency, a drug that is equivalent in the tables. But in terms of trying to look at overall harm to society -- and I don't want to get too far into this debate.
I mean, there are people that argue marijuana is helpful, it has benefits, at least it's natural. This drug apparently is not natural, it can easily be adulterated, there is no quality control to it. It doesn't seem to do anything good for society. It has been ruled that it is illegal, it is a controlled substance by DE.
So if you are trying to figure out where it is on the scale of drugs in terms of harmfulness to society, how would you approach that?
THE WITNESS: I don't know that I can answer that. I mean, I would start -- I would look at some of the data that we have seen today. I think it's important to understand that

it's always a question of relative risk because there is no drugs that are absolutely safe. And so if we -- if we had an idea of how many people actually used XLR-11 and we could compare that to the number that has shown an adverse effect, that would give us a better handle on the risk.

I mean, if it is .OO1 percent, I would argue that that's -- there is a greater risk of being injured in a car accident than there is from that. On the other hand, if it is common, if these effects occur frequently, then that would shade my decision a little bit, too.

So I mean, clearly, there has been some cases, and I don't disagree that this drug has been found in people who have died, and certainly I don't advocate, you know, harm to anyone, but I think we have just got to -- you know, it's a complicated question.

I'm here to kind of answer the science. I'm not a good policy person, and I would leave that to others to determine policy, but hopefully based on good science.

I mean, as a scientist, I'm trying to promote that there are ways to do this that are fair, that are -- get out the truth a little bit. I'm more in favor of that than kind of speculation, which I often see.

THE COURT: Okay. Thank you.

Go ahead, Ms. Lineberger.

CROSS-EXAMINATION

BY MS. LINEBERGER:

Q. Good afternoon, Dr. Cozzi.

A. Good afternoon.

Q. Dr. Cozzi, you are a professor at the University of Wisconsin; is that correct?

A. Yes.

Q. And you have some particular areas of focus in your research and your teaching at the University of Wisconsin, correct?

A. Well, my research is more focused in teaching. I teach medical pharmacology to second year medical students, so I teach broad areas of pharmacology, including everything from anti-inflammatory drugs, drugs for hypertension, you know, antibacterial drugs, and so on. So my teaching role is broader than my research role.

Q. And one of the focuses of your teaching and your research is the study of psychedelic drugs; is that right?

A. Yes, or hallucinogens, right.

Q. Do you still teach that course, the undergraduate course, in psychedelic drugs?

A. I believe you are talking about the course at Northern Illinois University; is that correct?

I don't teach a course in hallucinogens at UW. I do give one lecture, as part of a 48-lecture series, when I teach

about drugs that affect the central nervous system, I do talk about hallucinogens.
Q. And is that the course at Northern Illinois University?
A. This is at University of Wisconsin in Madison.
Q. Okay. So one of the longest running courses that you have taught -- you have taught is an undergraduate course in psychedelic drug research, correct?
A. Okay, if I may clarify that. I'm a guest lecturer by a course that is taught by Professor Tom Roberts at NIU, and so he has called me in once a year to give a talk on hallucinogens at NIU.
It is not what we would -- it is not my course, per se. I think you phrased it as being my course. It is Dr. Robert's course.
Q. So you are a -- you have been invited to give lectures down at the Northern Illinois University since -- once a year since about 1986; is that right?
A. That's correct, yes.
Q. Now, how many times have you testified on the issue of comparing XLR-11 and other synthetic cannabinoids to THC as of today?
A. Several, under five.
Q. Under five?
A. Three to five times, four times perhaps.
Q. And was one of those the Last Place On Earth Case with --

A. I'm not sure.
Q. -- a defendant by the name of Carlson?
A. Oh, yes. It was a Minnesota case. I testified on synthetic cannabinoids, yes.
Q. Now, can you tell us, in all, how much you have gotten paid for your opinions on the subject specifically of synthetic cannabinoids and comparing them to THC since you started --
A. Right.
Q. -- testifying on that particular subject.
A. Well, I have a flat retainer fee of $2,000, and then I have hourly fees that vary based on what I'm asked to do.
So I have an hourly fee for report writing, $300 an hour; I have an hourly fee for testimony, for travel, and so on. So the fee varies, and it's basically on a case-by-case basis.
Q. Just talking about the synthetic cannabinoid cases, comparing them to THC, you start with a $2,000 retainer?
A. Yes.
Q. Do you ever give any of that back?
A. Do I get any of that back?
Q. Do you ever give any back?
A. No. It is a nonrefundable engagement fee.
Q. So it is fair to say, for every case, you get at least $2,000; is that right?
A. Correct, yes.

Q. And then on top of that $2,000, then you start charging for reviewing the documents, correct?
A. Well, the $2,000 essentially buys whatever the math works out to -- six, seven hours of consultation time, which is deducted from that retainer fee. If we exceed that, then there's charges in addition to that.
Q. Okay. And then that's when the $300 an hour kicks in?
A. No. The $300 an hour is deducted from the 2,000 until that is exhausted.
Q. Have you exhausted it in this case?
A. Yes, I have.
Q. How much have you gone over the $2,000 in this case?
A. So far, I have received $5,000.
Q. Not as a retainer, though.
A. Well, part of it was a retainer, yes.
Q. So you have gotten 5,000 in this case.
A. Yes.
Q. Have you gone over that yet?
A. I don't know yet. Not so far I haven't, no.
Q. Out of that 5,000, are you going to deduct your travel costs or does that come on top of the 5,000?
A. Well, the travel costs, it depends on whether I have to purchase my own tickets or whether the client purchased them in advance. In this case, my client purchased my travel tickets in advance, so it wasn't deducted.

Q. And you said that, you know, it depends on the case, how much you charge per hour --
A. No, I didn't say that. I didn't say -- I have a set fee per hour, that's invariable.
Q. And that's $300.
A. Yes.
Q. Regardless?
A. Well, I mean, there is 150 if I have to do, you know, travel, for example, or it's -- it depends on what task I'm assigned to do.
I'm happy to provide my fee schedule for you.
Q. Do you have one?
A. I don't have it with me, but I would be happy to provide it to the Court, if you would like it.
Q. Yes, please.
Now, have you done any studies personally regarding XLR-11 or any of the other substances in this case?
A. Do you mean laboratory studies or --
Q. Yes.
A. No, I haven't.
Q. Do you have any personal data on these compounds to date?
A. I don't have personal data that I have acquired.
Q. You have no paper published on these specific issues, correct?
A. Correct.

Q. You have not been peer reviewed on any papers that you have written on these specific issues, correct?
A. Correct.
Q. So you haven't written anything in a paper to contradict the studies that have been supplied by the Government in this case, correct?
A. I haven't written anything in a paper about these substances, other than my declaration.
Q. You have written similar declarations in the past, haven't you, with regard to synthetic cannabinoids and their comparison to THC, have you not?
A. I have.
Q. Do you charge for the same declaration over and over and over, or do you give them a discount because you have already written the declarations before?
A. The declarations are different.
Q. Now, Dr. Cozzi, besides teaching at the various universities where you are a lecturer, either on staff or visiting as an adjunct, you are self-employed, correct, aside from those teaching jobs?
A. Well, I do consulting work, if that's what you are referring to, which is kind of self-employment.
Q. And is that consulting work the appearing in criminal courtrooms consulting work, or a different kind of consulting work?

A. Sometimes it is, it is legal work; sometimes it is consulting for pharmaceutical firms; sometimes it's report writing on new compounds for private clients; it varies. I try to use my knowledge and experience where it might work best.
Q. Sometimes, attorneys will just hire you to run something by you on a case, as opposed to having you travel and write a report and appear on the stand; is that correct?
A. That's correct, yes.
Q. When you -- you will agree that when you testify in a criminal case, you make the most money of those legal consultations, correct?
A. The most money for the most hassle.
Q. I take that as yes.
A. Yes.
THE COURT: Or compliment, however you want to look at it.
BY MS. LINEBERGER:
Q. It is fair to say that you are making money testifying repeatedly on the same types of cases, these synthetic cannabinoid cases, correct?
A. Well, I don't how to answer. I mean, yes; but I would remind you that I have also testified in cathinones, cocaine, psilocybin mushrooms, opium, antiseizure drugs, anticancer drugs, numerous drugs, including synthetic cannabinoids.
Q. How many times have you testified for the Government?

A. For the Government?
Q. For the prosecution.
A. Let me think. I think it was maybe zero.
Q. None?
A. None.
Q. And you have testified against other pharmacologists like Dr. Trecki, correct?
A. I have.
Q. You have met him before.
A. We have met before.
Q. Do you ever share a ride when you are going to these cases?
A. We haven't shared a ride, but we maybe have exchanged pleasantries in the hallway.
Q. How many years would you say -- just only on synthetic cannabinoids because I know you have a specialty in the psychedelics, but just on synthetic cannabinoids, how many years would you say that you have been testifying in criminal cases on the issue of synthetic cannabinoids compared to THC?
A. Two, three years.
Q. Yet you have never done a study on the issue?
A. Well, I have done literature studies.
Q. You read what other people write and studies that other people do, but why haven't you done one?
A. So many drugs, so little time. I study other compounds.

As I mentioned earlier, I'm deeply involved in cathinone research. I supply materials to NIDA as well as other institutions, and it just, you know, would that I could. It is just something that I haven't devoted my time to. I don't really have a good reason for it, it's just, you know, time constraints, I guess.

Q. But you know this is an important issue, don't you?

A. Well, I wouldn't disagree with that.

Q. Will you agree with it?

A. Yeah, I would agree that synthetic cannabinoids are an important issue.

Q. And you have a lab.

A. I do.

Q. But you haven't done a study to prove, once and for all, that doctors like Trecki and Gatch and Shanks and Wiley and Buffie, you haven't done your own study that they are wrong, have you?

A. I'm not aware that Dr. Trecki has actually done any of these studies either.

Q. All right, leave him out of it. What about Gatch and Shanks?

A. I know Gatch and Forster do these studies, they focus on cannabinoids. I think they have done a study on tryptamines and also on cathinones.

Q. But my question is, why haven't you done one?

A. I mean, I don't --
MR. SCHELLER: Your Honor, asked and answered.
THE COURT: Sustained.
BY MS. LINEBERGER:
Q. Is it because you make more money sitting on the stand testifying about the same thing over and over and over?
MR. SCHELLER: Your Honor, I think that she has gone over this area.
MS. LINEBERGER: I'll move on, Your Honor.
BY MS. LINEBERGER:
Q. You agree that it's important for a study to be published and peer vetted, correct?
A. Yes, I do.
Q. And you are aware that the studies of Gatch, Shanks, and the 2013 studies of Wiley have been published, correct?
A. I am aware, yes.
Q. So how do you keep your same opinion and you have never done a study yourself?
A. Well, to my knowledge, no human studies have been done since I started testifying, so the situation remains unchanged.
There are still no human studies, and the evidence I have read and heard about relies on unreliable animal studies extrapolated to the human being, and as I think I have tried to explain, these studies are unreliable and not reproducible.
Q. But you haven't tested it on a human being yourself, have

you?
A. No, I haven't.
Q. Okay. You would like to see a clinical trial before you make your own decision; is that right?
Is that fair to say?
A. Well, to make a decision regarding human effects, yes. It -- in fact, it is -- by law, new drugs must be tested in humans according to acts of Congress and the FDA, so I'm totally on board with that.
Q. Would you require somebody to do a clinical test or the FDA to do a clinical test on something that has been decided to be a schedule one and have no purpose --
A. Yes.
Q. -- for human consumption?
You would still want it done?
A. If there is a -- I mean, our knowledge of pharmacology changes over time, and what was once thought to have no medical use may be supposed to have a medical use as a new condition arises or somebody gets another idea, so these need to be revisited. Indeed, it still may turn out that there is no medical use.
But just a case in point, Marinol, it is schedule three substance, as we heard today. So before it was made schedule three, it was a schedule one substance; but somebody did the research, and somebody decided that it did have benefit

to people, and so it was rescheduled as a schedule three, and that was only possible because human studies were done.
Q. How many people died in those human studies?
A. I don't know.
Q. You don't know that any died, do you?
A. I don't know that any died.
Q. You never researched that? You do -- strike that. I withdraw that question.
You do agree with Marinol, the benefits of Marinol have been deemed by the FDA because of the special type of THC it is, because it has been fused or infused into sesame oil, and then locked inside of a capsule so somebody can't go to the corner and snort it, you will agree that Marinol, the benefits outweigh the adverse effects, don't you?
A. Well, I take issue with some of your statements. Just because it is in sesame seed oil doesn't mean it can't be abused. One can certainly take it orally. One can extract the sesame oil and put it in one of these e-cigarettes that Dr. Trecki mentioned so it could be vaporized.
So the fact that it is in a sesame seed oil capsule does not preclude abuse. That's why it is still a schedule three, it still has a highly probability of abuse. A schedule three is more restrictive than a schedule four or five.
So with -- you know, there are drugs in schedule two, these have accepted medical uses, the benefits are there, there

is no substitute, et cetera. So I'm just trying to explain to you that I can't, you know, conclude that Marinol can't be abused and that it's only used as a last resort.

Q. How long does it take to get a clinical trial approved?

A. It takes about eight months going -- and there are several -- several phases to it. If you would like me to go into it, I would be happy to.

Q. Just hold that thought.

A. At least eight months, let me amend that.

Q. At least eight months?

A. Yeah.

Q. Okay. And how many designer drugs are there, including synthetic cannabinoids, bath salts, cathinones, as we discussed?

Approximately how many are you aware of as of this date, because we know how the molecules get tweaked every few months?

A. Yes. Well, to my -- the last time I checked, there were approximately 80 cathinones and, you know, probably a similar number of synthetic cannabinoids.

And not to mention, there are other classes of drugs, tryptamines; Dr. Trecki mentioned the NBOMEs. These are recent -- or a more recent addition to the psychoactive drugs available. Many, let's say hundreds.

Q. Hundreds?

A. Sure.
Q. How much does a clinical trial cost?
A. Millions of dollars; probably 5 to 10 million. I'm just guessing, but many millions of dollars.
Q. But you present no contradictory studies that you have done, correct?
A. Contradictory studies --
Q. That you have personally done on these synthetic cannabinoids, correct?
A. I'm not -- what do you mean by -- I'm not sure what contradictory study refers to.
Q. Well, you don't present any contradictory information about -- against the Government here.
A. Well, what I'm saying is that the studies that have been relied upon to draw conclusions about XLR-11 are not reproducible and they are not reliable.
Q. Where is your paper on that, though?
A. I have used papers by Gatch and Forster to show that the methodology that is being relied upon is not reliable.
Q. The old version of their paper, the one from 20 --
A. 2014.
Q. -- 2014, instead of the current 2015 data?
A. Right. But if something is reproducible, 12 months shouldn't make a difference. In other words, the ED50 for Tylenol is the same today as it was 30 years ago.

Q. And Tylenol is an FDA approved drug?
A. It is.
Q. And we are talking about drugs that have no medical purpose whatsoever, correct?
A. Well, that we know of, have no medical purpose that we are aware of.
Q. But you still want to say more is needed, and you don't trust the results, is that what you are saying?
A. No. What I'm saying is that the results can form the basis of a hypothesis that must be tested in human beings before one can reach a conclusion regarding the effects of these drugs in users or in people.
We can certainly say what they do to rats. We can say what they do to mice, but we don't really know what they will do to humans, at least in a controlled fashion with controlled dosages and controlled conditions.
Q. We have discussed that you haven't done these studies yourself. Have you even tried to contract out for someone else to do the study, have you done that?
A. No, I haven't.
THE COURT: We are pretty much covering the same territory. Let's finish up, if you can, or move on to another area.
MS. LINEBERGER: Yes.

BY MS. LINEBERGER:
Q. So you want the DEA and the Government to wait eight months for a clinical trial and spend millions of dollars?
A. Well, the DEA and the Government would probably not be the bodies that would conduct these studies. These would be --
Q. They would be the ones paying for it, wouldn't they?
A. No. It would be either a pharmaceutical company or a private institution that would pay for the human trials.
Q. Isn't it impossible to know how many people abuse a drug like oxy?
A. I don't know that it's impossible.
Q. Do you have a figure?
A. No, I don't.
Q. Do you have a figure on how many people abuse Benadryl?
A. No, I don't.
Q. How about people that abuse Xanax?
MR. SCHELLER: Your Honor, objection to relevance of this question.
THE COURT: Sustained.
We still have cross of Dr. Trecki and one more witness, too, so let's try to finish up.
BY MS. LINEBERGER:
Q. Counsel asked you about Dr. Trecki's study using rats that was specifically with regard to their ability to discriminate between THC and XLR-11, isn't that correct, that's what the

purpose of that test is?
A. I'm unaware of any studies performed by Dr. Trecki.
Q. I'm sorry. Those referenced by Dr. Trecki use rats to discriminate -- to see if they could discriminate between THC XLR11; is that correct?
A. Yes.
Q. And those rats could not discriminate between them, is that correct, you agree with the findings?
A. Yes.
Q. That's totally different than a potency argument; isn't that correct?
A. Well, let me clarify that because the ED50 for THC itself, which is the training drug against which XLR-11 is being compared, those numbers themselves are not reproducible or reliable. I have significant doubts about the reliability of the numbers for XLR-11.
Q. But in all of -- I'm sorry, go ahead.
A. So in other words, if the standard, if the yardstick against which we are measuring XLR-11 changes from study to study, then we can't say anything about XLR-11.
Q. Isn't it true that in all of those studies, however, the THC -- it took more THC than it did those synthetic cannabinoids to cause the --
A. I don't recall the actual numbers. And again, I'm not -- I'm not as enthusiastic about the protocol. I pointed out some

of the limitations; small number of rats used, small number of this fixed ratio responses. And so, as I mentioned, these factors increased the likelihood of finding a response. So I'm not sure that the response they found is even, itself, reliable.

I mean, I know these were peer reviewed and I respect that very much; however, as I pointed out, the numbers for THC itself changed. And so as a reviewer, as a peer reviewer myself, I would ask those authors why are those numbers different before I would allow this to be published.

Q. You will agree, in both of the articles, it took more THC than it did XLR-11, PB-22, and AB-FUBINACA to cause the reaction, correct?

That was consistent between the two studies; isn't that correct?

A. No, it's not correct.

THE COURT: You really need to finish, if we are going to finish today with these scientists or experts.

MS. LINEBERGER: May I approach the witness?

THE COURT: Certainly.

BY MS. LINEBERGER:

Q. Is that the table you were referring to?

A. That's one of the tables.

So this is THC. It has got XLR, et cetera, et cetera. And there is another table and another Gatch and

Forster that compared the JWH compounds.
Q. You will agree, no matter which table you look at, XLR-11 is right below the THC, you will agree to that.
A. I do not agree. In fact, XLR-11 is not on the other table. It is on this table, but it is not on the other table.
MS. LINEBERGER: May I have the report that you showed, the 2014.
BY MS. LINEBERGER:
Q. So XLR-11 is not on there. Why is that table relevant?
A. Because it has the ED50 for THC listed at 0.56, plus or minus 0.07 milligrams per kilo. And a second study by the same researchers, the ED50 is listed at 0.85 milligrams per kilo, plus or minus .12; 152 percent difference.
Q. You know there is a difference between a mouse and rat, right?
A. These are both rats. They are Sprague Dawley rats acquired from Harlan Laboratories in Indianapolis.
Q. Really?
A. Really. It is under methods, animals.
Q. The 2015 also includes the locomotor depressant effects in mice, don't they?
A. Yes, they do.
Q. Do you still advocate the psychedelic research and experimentation with psychedelic drugs exposed in the Entheogen Review journal?

A. Again, this is a policy issue. I wrote an article that provided guidance for graduate students and medical students who sought to enter this field.

I think you are referring to that article and basically, the message was, Stay in school, study medicine, study neuroscience, study psychiatry.

Q. And infiltrate the profession so that the minds of people could be changed as to the use of psychedelic drugs. You were a contributor in that article; is that right?

A. I think there were probably 20 authors in that article, I don't recall the specific words. We didn't -- all of us contributed and I don't remember that specific package or what you are referring to.

As I said earlier --

Q. I'm sorry, there is no question.

MS. LINEBERGER: Thank you, Your Honor.

THE COURT: Redirect?

MR. SCHELLER: Yes, just very briefly, Your Honor. I'll make it brief, Your Honor.

REDIRECT EXAMINATION

BY MR. SCHELLER:

Q. We heard about -- we heard some testimony about your affidavits and similarities. Just to clarify, when you do an affidavit or a declaration in a case, you create it separately or independently for that particular case, right?

A. Yes. For example -- do you want me --
Q. Yes.
A. Well, in this case, there are a number of compounds I never encountered before, the AB-FUBINACA, et cetera, these compounds I have never encountered before, so I had to do research -- new research on it and come to my conclusions.
Q. When you were --
I'm going to approach the witness, Your Honor, and just give you Government Exhibits 6 through 13.
Do you have those in front of you?
A. Yes.
Q. Have you seen those -- those are affidavits created by Dr. Trecki; is that correct?
A. Yes.
Q. And have you reviewed those affidavits --
A. I have.
Q. -- prior to testifying today?
And did you notice anything about those seven affidavits?
A. Well, they are practically carbon copies of each other.
Q. Thank you.
Now, is there any way to know -- based on a rodent study, is there any way to know how XLR-11 will effect a human being?
A. No.

Q. Is there any way to know, when rodents were given XLR-11, they were feeling the same effects as when they were given THC?
A. No.
Q. Doesn't marijuana have acceptable medical uses, even though it is classified as a schedule one drug today?
MS. LINEBERGER: Objection, I ask that he not lead his own witness.
MR. SCHELLER: I'll rephrase it.
BY MR. SCHELLER:
Q. Does marijuana have acceptable medical uses, despite the fact it is schedule one substance?
A. It does on a state-by-state basis.
MR. SCHELLER: Your Honor, one moment.
Your Honor, Thank you.
May the witness be excused?
THE COURT: Yes. Thank you, Dr. Cozzi. Hope you make your plane.
THE WITNESS: Thank you.
(Witness excused.)
THE COURT: Why don't we take ten minutes and return for your cross.
(Recess was had at 3:05 p.m.; and the proceedings resumed at 3:15 p.m.)
THE COURT: Okay, please be seated.

Please continue.

MR. LUBIN: Thank you, Judge. So this is for cross, now, Dr. Trecki.

DR. JORDAN TRECKI, GOVERNMENT WITNESS, PREVIOUSLY SWORN

CROSS-EXAMINATION

BY MR. LUBIN:

Q. Doctor, good afternoon.

First, let me ask you, so you are not in private practice, right?

A. That's correct.

Q. You have an employer, right?

A. Yes.

Q. And your employer is the DEA, right?

A. Yes.

Q. The Drug Enforcement Administration.

A. Yes.

Q. Which is the Federal drug law enforcement agency, correct?

A. Yes.

Q. And your job is to go around the country testifying for the DEA and to explain to courts, judges, juries, whatever the case may be, what position the DEA is taking on certain issues.

A. Absolutely not.

Q. Oh, so your testimony here is not to tell the Judge what position the DE has taken on XLR-11 and what drug it is most similar to?

A. This is a small portion of my job, but not my main role and responsibility.
Q. Oh, one of your roles, then. I guess I misstated it.
A. A minor role, yes.
Q. Now, I think you said you have testified on this -- on synthetic cannabinoids, what did you say, 20 times?
A. Over 20, under 25.
Q. Okay.
A. Something like that.
Q. Now --
A. Excuse me, not all synthetic cannabinoids, some of those were bath salt cases, also.
Q. Okay. Let's talk, though, about some of the things that are very clear right now, then I'm going to move on to a couple of other areas.
There are no human studies regarding XLR-11 and its effect on human beings, correct?
A. No clinical trials I'm aware of, correct.
Q. Or studies anywhere that you are aware of.
A. Well, I personally believe that the manufacturer of these drugs, as they distribute around the country, are using the population as human guinea pigs, so I believe there are human studies, and that was demonstrated in some of the case reports.
It wasn't legally defined like a trial would be through the FDA. That's why I used word clinical trial.

Q. Counsel spent some time cross-examining Dr. Cozzi on the fact that he, himself, had not conducted any laboratory studies regarding XLR-11. Did you hear that just now?
A. Yes.
Q. Neither have you, correct?
A. Yes.
Q. That's correct, right?
A. Correct.
Q. You are an office guy, correct?
A. That's correct, I do, I work in an office environment.
Q. Okay. And you read studies of others, correct?
A. Correct.
Q. And you come to conclusions based on your education and what you have read, correct?
A. Correct.
Q. There is some discussion here about whether or not the studies with mice have some transferability into how XLR-11 might rank vis-a-vis THC, correct?
A. Yes.
Q. The studies that you have referred to are studies that, more or less, give the mice a saline or a negative and then another drug to compare it to, correct?
A. Yes. If I may correct, there are mice and rat studies, just to be --
Q. We will just call them rodents, then, okay, rodents?

A. Perfect.
Q. All right. There is no study, however, which tells the observer what that rodent is feeling when he is given a different drug, correct?
A. Not entirely, that's not true.
Q. Then please tell the Judge which study there is that tells the observer what the rodent is feeling when he is given a certain drug.
A. Your Honor, where this stems from is -- and this has been used in many cases in the past. When you look at a single study, like the drug discrimination, this was not the first time the studies were ever done. You have to look at decades of research.

We know what marijuana does to people, we know what THC does to people. We know the feelings because people have taken the drug and told people what they are doing. Scientists have established what the CB1, what the CB2 receptors have done for a long time.

To summarize, there is a lot of additional research that goes into the planning and the science behind the drug discrimination. While the rodent cannot draw their feelings or stand up and tell you what they are feeling, it is understood from the binding study.

We know what THC and XLR-11 are binding. We know what they are doing in the molecular level, we know that they

are agonist to the CB1 receptor. We know that other agonists that bind the CB1, like THC, cause psychoactivity. So when you give an animal a single drug like THC or XLR-11, from the previous studies, we know what they are doing, we know where it is acting, we know what it is happening on molecular level.

So even though they can't tell their feelings or adverse effects in person, by those animals choosing the correct lever and showing they can't discriminate between THC and XLR-11, you take that into accord and the science behind the study is what can also speak to the results.

Q. So the answer to my question is, there is no way to know what the rat or the rodent is feeling, only that he is discriminating between the XLR-11 or the THC and saline.

A. The final results of the test are -- that's what that describes.

Q. And you can deduce that if a rodent is trained on, let's say, the THC, to push a lever and if he gets it right, he gets a little pellet of food, that what he has learned is that there is something there that doesn't feel like saline solution, push the lever, I'll get it; that's what he is being basically trained to know.

A. Correct, but it also differentiates, if you were to use THC as your control drug. So the animals are trained on THC and then you give him methamphetamine, the animals will not press the THC lever because it is just a high or a no high. They

would just press random levers back and forth, and that's been shown.
Q. Except that none of the studies that you have brought before the Court show that the rodents in the -- in the cases we are talking about here were given other things, other than THC and XLR-11, correct?
A. Correct.
Q. So what they were given is a saline, which was a constant, and then something else; and if most of the time they press the lever that it was something else, the conclusion that you are drawing from it is that they felt the same way with the something else as they did with the THC.
A. Correct.
Q. The hypothesis then is that THC is making the rat feel the same way as XLR-11.
A. Yes.
Q. And then the secondary hypothesis is that, therefore, humans will feel the same way when given either THC, if you put them a cage with a little lever to push, they would push the lever the same way for either THC or for XLR-11.
A. In your last statement, you used the word same, and I said yes. I should have corrected you to say similar. The drugs are not the same, clearly, they are not the same. They are not chemically similar. The pharmacologic effects are similar, but they are not the same.

Q. So we know, for example, that they -- we know for a fact that they are not chemically similar, so that we can eliminate, under the guideline analysis, A, and we are really talking about B and C. We are talking about the pharmacological effect, right?
A. Correct. There is no reason to talk about chemistry at all in the proceeding --
Q. So we are talking --
A. -- and potency.
Q. We are talking about B and C.
A. Correct.
Q. And B and C are pharmacological effect, and what else?
A. The lesser or greater amount of drug in terms of its effect, also known as the potency.
Q. We are talking about the potency, which, in lay terms, is strength, right?
A. Yes.
Q. And we are talking about the pharmacological effect; in other words, what does that particular drug do to you.
A. Yes.
Q. And it is conjecture or it is a hypothesis as to what XLR-11 will do to you because there are no tests on humans that you have, so you are drawing on what it did to the mice.
A. I would say that the rodent studies are extrapolating -- or you can extrapolate the data to humans, that's been shown many

times, and Dr. Cozzi would disagree. There have been times when it hasn't been applicable in extrapolating to humans, but that also differentiates between a drug, like XLR-11, that is not a drug attempting to come to market for clinical trial and what he was saying, how a drug that could be intended for human consumption for a clinical trial.

There is a large separation here that he kind of clouded, in my opinion, comparing XLR-11 and the clinical trials.

Q. Yeah, but let's talk about the questions that I'm asking you, which are, it is a hypothesis to you that XLR-11 has a similar effect on human beings as THC, since you have not had those scientific studies to verify.

A. Well, once again, I would say that they do exist in the case records.

Q. The anecdotal case reports, I will talk to you about those. In terms of scientifically controlled study, you don't have it.

A. Correct.

Q. So it's a hypothesis. It may be right or it may be wrong, but it is hypothesis, right?

Just like the crack cocaine analysis was a hypothesis, for years it was a certain ratio, not --

MS. LINEBERGER: Objection to crack cocaine, Your Honor. There has been --

THE COURT: You are against the crack cocaine?

MS. LINEBERGER: I'm sorry?
THE COURT: You object to crack cocaine?
MS. LINEBERGER: I do object to crack cocaine.
THE COURT: I'll accept her objection to crack cocaine, but go ahead and ask your question.
MR. LUBIN: Does that mean you are sustaining it or overruling it?
THE COURT: Ms. Lineberger objects to crack cocaine.
MR. LUBIN: As do I.
THE COURT: So go ahead with your next question.
BY MR. LUBIN:
Q. There was an analysis done that crack cocaine should have a higher guideline level than powder cocaine, correct?
A. I'm not familiar with the legislative history of it. I do know there was a change.
Q. So you don't know about crack cocaine guidelines or any of that?
A. Not off the top of my head right now, no. I know cocaine is 200 to 1. I'm not sure what crack cocaine -- the equivalency is.
Q. There are certain studies called binding studies, and those would be the in vitro studies in the test tubes, right, about which receptors THC bind to and how strongly, and which receptors XLR-11 binds to and how strongly, correct?
A. Yes.

Q. But those tests do not even tell us whether or not the substance actually even gets to the brain, right? It only tells you about how the receptors are reacting to it, correct?
A. Correct. The -- since they are in the test tube --
Q. Right.
A. -- the drug isn't going anywhere. It is a cell line and the affinity study, I described it before in the presentation. You said it correctly.
Q. And what affects us, what gives us that effect from a drug is when it gets to the brain, that's what affects our behavior, our sensibilities, correct?
A. When these drugs bind to and activate the CB1 receptor in the brain, yes, that's whenever you exhibit the psychoactivity.
Q. Okay. Now, you're aware, aren't you, of the publication by the National Academies of Science and the recommendation they made for laboratories involved in forensic work.
A. No.
Q. Okay. Are you aware that the recommendation is that law enforcement should not supply the scientists to then testify in cases involving law enforcement in a court of law because there is an inherent prejudice in that?
A. No.
Q. All right. Now, you testified earlier about some of the anecdotal information. I want to go over that with you.
This is not the scientific studies, but some

anecdotal information that you've compiled that connects in some way to XLR-11. Do remember those -- that testimony from earlier?
A. Specifically, what are you referring to, which part of it?
Q. You collected anecdotal information about a situation in this city, or a situation in that city, or somebody that went to a hospital and had adverse effects from something, all of those studies that you talked about earlier -- not studies, that anecdotal information that you compiled.
A. Yes.
Q. There are no numbers on the number of people that use XLR-11, are there?
A. I know that based on the National Forensic Laboratory information system called NFLIS. It is a DEA run program where we collect data from state, local, federal laboratories, I know that was a lot.
The NFLIS program does collect information on the top drugs abused in the country. XLR-11 is in the top ten drugs abused nationwide.
Q. And you also know just about seizures. You know that there were a lot of XLR-11 seized and you had the big -- the moving picture with the circles that got bigger and smaller. Do you remember that?
A. That was just from there, yes. XLR-11 was one of the highest seized products nationwide of all of the cannabinoids.

Q. And you can extrapolate from seizures that there is a lot of XLR-11 on the street and a lot of people are using it, right?
A. Yes.
Q. Would you say a million people?
A. I couldn't give you a number.
Q. Well, certainly tens of thousands, based upon --
A. I could not give you a number.
Q. Well, what is a lot to you; five?
A. I can't give you a number.
Q. You use the term a lot, you agreed a lot of people are using it.
A. Because it is in the top ten abused drugs in the country, I would infer, based upon the other drugs on that list, the hydrocodone products, et cetera, the heroin, that a lot of people are using them.
So if the XLR-11 is on that list, it must be a great number, but I don't have a value for you.
Q. So taking a great number that we don't know what it is or even close, we will call it X, right?
A. Sure.
Q. You don't know what percentage of X people have adverse effects, do you?
A. I do not.
Q. You don't know if it's one-hundredth of a percent, correct?

A. The answer is I don't know.
Q. Or one-tenth of a percent?
A. I still don't know.
Q. You only know that in a select few cases, there are some adverse effects that you say are associated with XLR-11, correct?
A. In the clusters of illness that I reported on in my paper, the substance identified in those overdose patients, the ones that required emergency room admission and treatment, the drug on board in some of those cases were XLR-11 or AB-FUBINACA, et cetera.
Q. Or a combination of various drugs.
A. It could have been a combination as well, yes.
Q. Right. And in that percentage of X, of the people that you saw that ended up in an emergency room, you really can't isolate whether or not their symptoms were related to XLR-11 or a combination of other things, or whether they -- what their physiology was, how sick they might have been, you can't -- you can't tell.
A. There have been a few published studies. Unfortunately, XLR-11, the highpoint of that drug was back in around 2013. It has since come down from its peak.
A good example is the paper we just published, the Tyndall, et al., in November 2015 on AB-CHIMINACA, another substance in this case. That was a prime example where we did

1 know, out of the almost 30 patients, that AB-CHIMINACA was the
2 culprit for the symptoms.
3 In most of those cases, there were no concomitant
4 drug administration, they were clean tox. We did see that a
5 majority of the patients required either ICU admission or
6 intubation.
7 Q. Let's talk about XLR-11, okay? Let's talk about that one.
8 A. All right.
9 Q. There is no data on the percentage of people who use XLR-11
10 that get adverse side effects.
11 A. There is no number I'm aware of.
12 Q. As a matter of fact, there is not -- there is not any data
13 at all as to whether it is affected by the dose of XLR-11 and
14 that that's what caused the side effects, correct?
15 A. I'm not aware of it.
16 Q. Right. Of course, as a pharmacist, you are aware --
17 A. Pharmacologist.
18 Q. Pharmacologist, every single prescription drug has side
19 effects if the dosage is not followed, correct?
20 A. Correct.
21 Q. Even Tylenol, as we said before. But any number of drugs
22 can cause adverse effects, even death, if the dosage is not
23 followed.
24 A. I wouldn't say death in certain drugs. If the -- I'm sure
25 there could be drugs out there; hair growth medicine, possibly.

Q. How about oxy?
A. I didn't say oxy. I said there could be drugs out there that even if you abuse the maximum amount, you may not die from it.
Q. No, but there are drugs that you might die from.
A. I'm correcting your statement. You said the word, and death.
Q. There are drugs that if you don't follow the directions and you abuse them by amount, they could cause death or serious adverse effects, there are drugs out there.
A. Yes, or serious adverse effects.
Q. That doesn't make the drug itself a bad drug. It means that you've got to follow the label and listen to what your doctor says, right?
A. It means that those drugs are medically approved, and they are efficacious, so the good effects outweigh the bad effects. That's not like XLR-11.
Q. Well, that's a different issue. I want to talk about adverse effects.
A. Okay.
Q. The adverse effects from XLR-11, as you said, may be related to the dosage.
A. It could be, I don't know.
Q. And the adverse effects of the these prescription drugs are generally related to the dosage, correct?

A. Correct.
Q. But anybody that watches TV knows that all of these drugs come with a warning, could cause these horrible things; death, or blindness, or leukemia, or all of these things that in some small percentage of the patients, they are going to have adverse effects, even if they follow the label on those drugs.
A. I think I have answered this multiple times.
Q. How about answering it right now?
MS. LINEBERGER: I would ask Counsel not to argue with the witness.
BY MR. LUBIN:
Q. Could you answer my question, please.
A. Once again, the answer is yes.
Q. Okay. As I looked at the documents that you testified to on direct examination, I think you had a bunch of the synthetics on there, and it was 700 plus different numbers of patients in clusters, it might have been 750.
It was over 700 that you testified to earlier and --
A. Did you tally the ones from my papers, is that where that number comes from?
Q. It was the paper that you -- it was the paper that you brought in, it is called Synthetic Cannabinoid Related Illnesses and Deaths.
A. I have actually never tallied the total number of patients in there, but if that's the number, I understand.

Q. Okay. Of those -- and you can look at it again, if you want, but of those, there were only two that were -- two cases in which AL -- XLR-11 was even associated with death, two cases, correct?
A. I would have to look in front of me, but if that's what you are asserting. There was a variety on there. I may have it here if --
Q. Okay. You can look at it, but I wanted to just follow-up and then you can tell me about that.
Associated with doesn't mean that it caused death, it means that it was on board, at least anecdotally, if not even a blood test or something, it was on board when the person died.
A. There was a positive toxicology, and we specifically put substance identified, rather than cause of death --
Q. Right.
A. -- because some of them, some of the drugs, for example, the AM2201, I know --
Q. I want to stick to XLR-11.
A. Okay.
Q. There may have been lots of other things on board, whether it was it alcohol or whether the person had the flu, or whether they had tuberculosis, or whatever else at the time, also. So you are not suggesting that that drug caused death in these cases that you mentioned, correct?
A. There is a large variety on here, probably around 60 to 70

1 percent where it was the sole cause of death, and the cause of
2 death was synthetic cannabinoid intoxication, but you are
3 correct, some of them were not.
4 Q. And only two of them related to XLR-11. I don't want to
5 talk about all of these other ones, but XLR-11, there were only
6 two where it was even associated with a death case.
7 A. Correct. And one of those, it was the cause of death; and
8 the other one, it was implicated.
9 Q. Okay. So of the however many thousands of people that
10 there are, what you have got before us here today is that in
11 terms of XLR-11, there is one case where a medical examiner
12 determined that it was the cause of death.
13 A. In my paper?
14 Q. Yeah, that you brought here.
15 A. The XLR-11, the other paper, there are two more, so now
16 that's three. The Shanks, et al., paper, 2015.
17 Q. I'm talking about your paper.
18 A. You were talking about XLR-11 deaths, we can't include
19 both?
20 Q. You can include whatever you want. But the point I want to
21 make here is that of the however many thousands and thousands
22 of people who have been using XLR-11 -- and we don't have a
23 number, we are calling it X, what you brought here today, so
24 that we don't have to even go over each number -- what you
25 brought here today is what you know about concerning death,

correct?
A. Correct.
Q. Okay.
MR. LUBIN: Your indulgence, Your Honor.
I don't have any further questions, Judge.
MR. O'BRIEN: Judge, may I inquire of this witness?
THE COURT: All right.

CROSS-EXAMINATION

BY MR. O'BRIEN:
Q. Good afternoon, Doctor.
A. Good afternoon.
Q. I've been up since 4:30 a.m., the only thing I have done on the record is introduce myself. You may not remember, but I represent that guy on the end there, Mr. Khalifa.
DEA is part of the executive branch, right?
A. I should know this.
Q. It is, trust me.
A. I'm sorry.
Q. And the executive branch has to run for reelection every four years, right?
A. Yes.
Q. And the DEA is largely reactionary to the public. Whenever there is a surge in drug activity, it causes the DEA to react to that and -- and do whatever it is that they do, right?
A. Yes.

Q. With respect to the synthetic cannabinoids -- I know there are multiple phrases and colloquial terms, but am I correct in saying that they are synthetic cannabinoids?

Am I pronouncing it properly, what we have been talking about today for the past, I don't know, 18 hours?

A. Yes.

Q. All right. With respect to those, this is a relatively new line of controlled substances. I think you said it started in the '80s, right?

A. The research on synthetic cannabinoids in general was around the; 80s. The abuse of drugs, like similar ones to the ones in this case, started in the early 2000s in Germany, throughout Europe. Like I said, late 2000s, it first appeared in the U.S., and it really increased in 2011, 2012.

Does that answer your question?

Q. Yes, it does.

What I'm getting at, I heard another witness -- forgive me, I don't remember who -- talking about cocaine, saying it has been around for thousands of years. This is in its infancy, that's the term I use. Is that a fair statement?

A. I guess. Relative to what?

Q. Relative to the drugs that the everyday person would know the DEA enforces; cocaine, marijuana, heroin, things like that?

A. I think I would agree with you that it is a relatively new

phenomenon, these designer drugs; however, they have become very mainstream. They have been in the news a whole lot.
Q. I'm going to get there, that's what I want to get at.
A. Sure.
Q. We don't -- an overdose will happen tonight, right, probably right here in West Palm Beach.
A. It could very well be.
Q. Could be cocaine, heroin, methamphetamine, opiates, could be all of those, right?
A. It could be, yes.
Q. Probably they won't be in the news tomorrow, right?
What is going to be in the news is if some 16-year-old kid gets ahold of whatever it is that we are calling it and something bad happens, that will be in the news, right?
A. I guess that's speculative. I can't really know what is going to be in the news.
Q. You read these articles, right?
A. Yes.
Q. I read them, I Googled them. You don't read about the 45-year-old black guy who dies of a cocaine overdose, you read about the 16-year-old white kid who dies of perhaps something related to this, right?
A. No. I would think they are both in the news, especially if something extraneous happens, a shooting or a public

situation.

I think the elderly man who dies in his house from a heroin overdose with a needle in his arm most likely won't make the news.

Q. We will save that for another day.

A. Okay.

Q. With respect to these adverse side effects that you have in your packet that you provided -- and I'm referring to -- I don't know what page it is, I apologize. I don't know the number, but it is titled Adverse Health Effects of Synthetic Cannabinoids.

Are you familiar with that particular page --

A. I am.

Q. -- if I ask you a couple questions?

A. Yes.

Q. It is not a trick. If you want to see it, I'll bring it over to you.

A. I have it here.

Q. Now, not all of these adverse health effects of synthetic cannabinoids are created equal, right?

I mean, if I'm looking at this, I would rather feel nauseous than vomit; and I would rather vomit than have cardiac ischemia; and I would probably rather have that than organ failure; and I would probably rather have that then death, right? So these are a wide range.

A. It is logical.
Q. Now, you talk, in the same packet, about various research that you have done regarding cases in Santa Ana, California; Middletown, Connecticut; Austin, Texas; Hampton, Virginia; Hagerstown, Maryland.
I notice that a lot of these are kind of mid-level cities. They are not New York City, it is not Miami. They are kind of these -- I wouldn't called them towns, but they are not major metropolises; is that fair?
A. The incidences in that paper are just as I was aware of them. I mean, like I said, I mentioned, in the past few weeks, you had three separate instances in San Diego, California. I would say that's a larger city.
Q. Absolutely.
A. Tulsa, Oklahoma. It is nondescript, it doesn't discriminate on age, race.
Q. Well, let's take on your page titled Synthetic Cannabinoid Related Illnesses and Deaths. In Baton Rouge, you have number of cases, 120; number of cases resulting in death, zero.
And then there are others that -- you know, Philadelphia, Mississippi, number of cases, six; number of cases resulting in death, zero.
There are some that have death, and they are usually in the single digits, the charts that I have seen.
What we don't know in those cases that I guess have

the adverse health side effects, if we are talking about something very serious or something as simple as being nauseous or vomiting, right?
A. No, not necessarily. The cases that are listed in that report were all patients requiring hospital admission.
Q. Well, I mean, you can go to the hospital if you are vomiting, right? If you are 16-year-old kid and you start vomiting, you are scared, your parents take you to the hospital, right?
A. You go to the hospital, you are not admitted.
Q. Okay. With respect to the movie that we saw --
A. Yes.
Q. -- and obviously, I don't have the ability to pop that up, but the gist of it, I think, I can convey to you and ask you some questions.
I believe you testified -- and correct me if I'm wrong -- that the research from the public health department showed about 2,500 overdoses and 34 deaths from March 29th to May the 11th of 2015. Did I get that about right?
A. Yes, sir.
Q. So I'm going to do this, make it -- try to make this simple for my next questions. If we just say -- give you the benefit of the doubt and say that we are talking about a month period, 30 days, and we have 34 deaths in one month, and you multiply that by 12 months, which is a year, and I did the math, you can

trust me, I come up with 408 deaths, right?
A. Correct.
Q. All right. Have you looked at -- I received these documents this morning and over lunch, I went to Google and I pulled up a website that I think you will say that you have seen before. It's the drugabuse.gov website, which is the National Institute of Drug Abuse, that's your folks, right, not mine?
A. No.
Q. Not Dr. Cozzi or anyone else, right?
A. Right. I think that's the NIH website.
Q. Right. And I looked at it, and I looked at the number of deaths from prescription drugs from 2014, 25,000; and opiates, 18,000; benzos, 8,000; cocaine about 5,500; heroin, 10,000 maybe 11,000. I can't really tell, the graph is hard to read.
That's significantly more than what we are dealing with right here, right?
A. That's a fair statement.
Q. So what we have is perhaps the executive branch overreacting to what is deemed to be this new wave of awful things happening, especially given the fact that, according to your own research, we are dealing with teenagers and people in their twenties.
A. I mean, I would disagree with your statement. Just as you said, this drug is more in its infancy, the fact these drugs

have been abused in the country since 2010, maybe five years, they have only been around and they steadily, from year to year, increased epidemically.

Q. Wait a minute. You told me that although it is in infancy, it is widespread, you can use it all over the place --

A. You --

Q. -- San Diego --

A. True, it is wide known and it is spreading.

Q. So my question is, I just went to 2014, I didn't say total deaths from 1950 to 2014, I used 2014, which is the most recent statistics from the website that you say is credible -- it is .gov, not .defense; and we have a enormous amount the deaths when associated with other drugs, and a very little amount -- and I gave you the benefit of the doubt because I put it all into 30 days.

So we have 408 deaths for this and, you know, 20,000 deaths associated with oxycodone pills, these pill mills that these doctors are running all over Florida.

A. I don't expect you to answer my question, I understand that, but I would have to -- if I could ask you a question, I would say, is 400 deaths acceptable? And my answer to that is not a single death is acceptable.

This is -- these are a bad group of drugs, they are increasing. There are hundreds of them.

Q. I would say that one death is unacceptable, but I also

would submit to you that based on what you just testified to, 324 months for that man, and I don't know what these two guys are facing, is unacceptable, based on your own statistics. That's what I would suggest to you.

A. Based, I guess, on statistics, I can see where your point is. But just as you said, one death is unacceptable.

We can't prove, at least I can't, that any Defendants in this case are responsible for the deaths -- maybe the Gainesville operator, let's take that one for an example.

Q. Yeah.

A. I know I have been told let's talk XLR-11, and that was AB-CHIMINACA, but just as an example, that was AB-CHIMINACA.

I can't prove that any of the drugs in this case or these manufactures are responsible for those deaths. But someone, someone in the country ordered these drugs, AB-CHIMINACA, they put it on plant material, they sold it to people, and 25 people or almost 30 people needed intubation or hospital admission. I'm just demonstrating the serious adverse effects of that.

Q. Absolutely, and I won't dispute it. I'm not for dying, I'm for living, but I'm also for fairness in the court system, and you made an interesting point.

You said, I don't want to deal with statistics. Your whole presentation, for the last three hours, has been statistics because you said you didn't go into the field, you

don't interview anyone, you just read things, right? That's based on statics.
A. I do not go in the field, I work from the office to collect samples and collaborate with people.
Q. And what is that called? You are researching statistics.
A. Well, I am also assisting in -- like for that paper, I assisted in that. So that's a lot more than just reading papers from other people, I actually did extra work. There is more than that.
MR. O'BRIEN: Thanks.
THE COURT: Redirect?

REDIRECT EXAMINATION

MS. LINEBERGER:
Q. Do you work for Homeland Security Investigations?
A. No.
Q. And that's the agency that did the investigation, along with Customs and Border Patrol that seized all of the drugs in this case, correct?
A. That's what I'm aware of, yes.
Q. Before today, had you even heard of a HSI Agent Christopher McBride?
A. I have to go back about a month, whenever we were discussing the case, but before our agency was contacted for support, no, I was not.
Q. So you didn't do your research based on this case?

A. No.
Q. Does it serve your purpose to fight a legitimate drug?
A. If it's being diverted and affecting public safety, then the answer, I think, would be yes.
But under legitimate use, under legitimate scheduling, legitimate prescription, legitimate use by patients, then the answer is no.
Q. In all of the studies that you have read and the reports from toxicologists, from medical doctors, from emergency rooms, have you found any legitimate use of XLR-11 or any of the other synthetic cannabinoids that these Defendants were found responsible for in the PSI, those listed today?
A. I'm sorry, repeat that. I kind of got lost.
Q. I forgot where I started.
A. I did, too. I'm sorry.
Q. Can I have that read back?
THE COURT: No, we don't read back. Let me remind you, we still have one more witness.
MS. LINEBERGER: Yes, Your Honor.
THE COURT: Now, we are trying -- this is largely argument, the last little bit.
MS. LINEBERGER: Yes, Your Honor.
THE COURT: Let's try to get to our last witness.
BY MS. LINEBERGER:
Q. You heard Dr. Cozzi discuss how 90 percent of drugs failed

in clinical trials or before getting to them, correct?
A. Correct.
Q. And you heard Dr. Cozzi discuss that he would want a clinical trial before making an opinion; is that right?
A. Yes.
Q. What is the difference between XLR-11 and the drugs intended for human consumption?
A. Your Honor, I'll make this very brief.
XLR-11 is not a drug that is being investigated for human use. A drug from Merck or Pfizer that's going to go through clinical trials would undergo much more rigorous testing, many more steps before they even see there could be a benefit, before you get to clinical trial.
XLR-11 was not made by a chemical company for use in humans. It was made by illicit manufacturers for abuse of its psychoactive properties only. So to demonstrate that this needs to be put into a clinical trial, this is not a drug that even is remotely or has the possibility of use in humans, so it's just unacceptable to say that you have to wait for a clinical trial in this drug.
If this was some legitimate drug from Merck, then it would have to go through clinical trials, if approved by the FDA. That's not what we are tacking about here. This is a drug designed by some lab in China solely to be abused.
Q. Is there any indication that there is any type of quality

control, even at these labs in China making these synthetic cannabinoids?
A. Not that I'm aware of.
Q. Dr. Cozzi talked about different ED50 values in the two Gatch papers. Can you briefly talk about that to the Court.
A. Briefly, Your Honor, Dr. Cozzi brought up two ED50 values and said that was not reproducible. In science, in-between experiments, in-between laboratories, you have variations between tests.

Those two values, the .85 and the .56, if you took 100 laboratories and had them do the same test, you would have 100 different numbers. Ideally, they should be close, and I would -- my opinion is that the .56 and .85 is definitely close. It is acceptable to use both Gatch studies.

And the final point is, regardless if you use the .56 number or the .85 number compared to XLR-11, it is either three times or four times more potent than THC, regardless of which number you use. It demonstrates that XLR-11 is more potent than THC.

MS. LINEBERGER: I have no further questions.

THE COURT: Okay.

Thank you, Doctor.

(Witness excused.)

THE COURT: You all have you one more?

MR. LUBIN: I do, Dr. Dudley.

MS. LINEBERGER: Your Honor, before Dr. Dudley is sworn, the Government has an objection to him testifying.

The issue before the Court is pharmacology and Dr. Dudley is not a pharmacologist. He is a chemist, and I would object to his testifying as an expert in the field of pharmacology, most respectfully to the Court and Dr. Dudley.

I have, from the United States District Court, in the Middle of District of Florida, where Dr. Dudley was disapproved, where the Government objected to his expertise as a pharmacologist and the court sustained it.

His testimony regarding -- his testimony as a chemist is irrelevant, since it is clear that the two pharmacologists in this case agree to prong A, the chemistry. We are dealing with effects and potency, which is not within the range of expertise of the chemist, Your Honor.

THE COURT: Okay. I'm going to overrule your objection. His vitae says he is an organic chemist with professional expertise in molecular pharmacology.

I'm going to hear him, despite the fact that he apparently teaches at FSU.

MR. SCHELLER: We will withdraw him.

MS. LINEBERGER: Your Honor, if I may, molecular pharmacology is not the same --

THE COURT: You will have a good chance to examine.

MS. LINEBERGER: Yes, Your Honor.

DR. GREGORY DUDLEY, DEFENSE WITNESS, SWORN

DIRECT EXAMINATION

BY MR. LUBIN:

Q. Good afternoon. State your name.

A. Gregory Dudley.

Q. What is your occupation?

A. I'm a professor of chemistry and biochemistry at Florida State University.

Q. Are you a doctor of chemistry?

A. Yes.

Q. From what institution did you receive your doctorate degree?

A. MIT, the Massachusetts Institute of Technology.

Q. And what is your -- what are your duty assignments and roles at Florida State?

A. I am one of the associate chairs of the department. I'm in charge of our curriculum, making teaching assignments, and assisting the chair with other administrative matters for the department.

I am a research active faculty member, with assignments of responsibility relating to research, teaching, and service.

On the research front, I supervise a graduate research group doing research relating to chemical synthesis of drug-like compounds.

On the teaching front, I teach courses in the classroom and supervise research in the lab relating to organic chemistry at the undergraduate level; and at the graduate level, organic chemistry more specialized in broader areas, such as -- and topics, like chemical synthesis, organic synthesis, or, for example, bio orthogonal chemistry, which is a relatively new field.

Q. Do you also review grant proposals from around the country?

A. I do. I provide peer review services for grant proposals to funding agencies, including the National Science Foundation, the National Institutes of Health, the American Chemical Society Research Corporation, many other funding agencies.

Q. Do you review manuscripts?

A. I do review manuscripts that are submitted for publication in peer reviewed journals; many, many different journals in the fields of organic chemistry and medicinal chemistry primarily.

Q. Medicinal chemistry, also?

A. Yes.

Q. In other words, medicinal chemistry would be chemistry related to the effect of chemicals on the human body, is that what medicinal chemistry is?

A. Yes.

Q. Are you also trained in the scientific method?

A. Yes, I am trained in the scientific method, yes.

Q. In other words, how to do research, how to -- all of the

things that are accomplished in the scientific methods, so that you can get -- that you get reliable results out of research that's being done.
A. How to make an observation, formulate a hypothesis, use that hypothesis to design an experiment, perform the experiment, make observations, and ultimately draw conclusions based on those experiments.
Q. So first, let me ask you this: Chemically, is XLR-11 chemically similar in any way to THC?
A. Not that I can -- not that I can see, not to my eye, nor to anybody's eye in the literature that I have read.
Q. From a chemical -- from an chemist's perspective, do you study how compounds bind to receptors and so forth and so on?
A. Yes.
Q. And is that one of the things you looked at here, in this case?
A. Yes.
Q. What is an in vitro study?
A. In vitro, as was mentioned earlier, it's test tube, in a glass; and so these would be studies done in a Petrey dish, in a test tube, in a controlled laboratory environment outside of a living system, outside of an animal where you might look at the interaction, for example, of the molecular recognition interaction between a small molecule, a drug-like molecule and a larger biomolecule, like a protein; see how they bind, where

they bind, how tightly they bind, if they bind, what sort of a change does that induce in the biomolecule, for example.
Q. What is a receptor?
A. A receptor is typically a protein on the surface of a cell, a transmembrane protein that would be on the outside of the surface, outside of the cell, interact with a small molecule and communicate that information inside of the cell.
Q. A receptor is something within the human body, is that --
A. Yes.
Q. -- is that what it is?
A. Yes.
Q. Is this all within the field of chemistry?
A. The interaction between the small organic molecule and biomolecule is very much a chemical interaction. To me, it is chemistry.
Q. What are the receptors within the human body that would interact with a drug-like compound, like THC or a compound like XLR-11?
A. The receptors that are known to interact with THC and/or with XLR-11 that are the primary focus are CB1, the first cannabinoid receptor; and CB2, the other main cannabinoid receptor. Those two receptors are the primary focus of cannabis pharmacology, but there may be others.
Q. But as to those two, do we know -- do chemists understand the difference between CB1 and CB2, what they each do?

A. The CB1 receptors are primarily located in the central nervous system in the brain. The CB2 receptors are primarily localized outside of the central nervous system in the peripheral nervous system, and psychotropic effects of marijuana are typically linked to interactions with the CB1 receptor.

The CB2 receptor is of much more of interest to pharmaceutical companies for modulation or mediation of pain, nausea, other indications.

Q. As to XLR-11, is there information as to which receptors it may bind to?

A. People have characterized and quantified the binding of XLR-11 to both the CB1 and CB2 receptor.

Q. As to the CB2 receptor, the one you said that was more -- the pharmaceutical company is more interested in, does XLR-11 bind in any special way to that?

A. Based on the data that's available, XLR-11 binds more tightly, more strongly to the CB2 receptor than to the CB1 receptor.

Q. In other words, more tightly to the one that would modulate pain, as opposed to the one that gets you high, is that a way to say it?

A. The one that's -- the one that's primarily located outside of the central nervous system that is not associated with getting you high, that is associated with other indications.

Q. Now, chemically speaking, is there any way to know whether XLR, when taken into the body, ever gets to the brain?
A. Not based on binding affinity studies, not based on functional assays. I mean, not based on any -- not to the -- yeah, not to my knowledge.
Q. Is there any scientific research that you have seen which would indicate whether the XLR-11 ever even gets to the brain?
A. Not that I can recall off the top of my head.
Q. Okay. Now, His Honor asked earlier, and I'm going to point this out to him at this point, that there is a sentence in the PSI that suggests that XLR-11 is synthetic THC.
THE COURT: I did look, I was wrong. There is a provision in the PSI that says that.
BY MR. LUBIN:
Q. Is XLR-11 synthetic THC?
A. No. It is a factual error in the report, yes.
Q. Is XLR-11 any kind of THC?
A. No. THC is THC.
Q. And is synthetic THC synthetic THC?
A. Yes.
Q. In other words, you can have either naturally grown THC or synthetic, but they are identical.
A. Yes. The delta nine tetrahydrocannabinol refers to a specific molecular substance, and THC is the common abbreviation for that substance, and that substance is THC,

whether it is produced by a plant or whether it is produced in a laboratory. It is the same substance, same properties.
Q. In terms of the studies that have been discussed here today with the rodents, I want to talk to you about the scientific method a little bit and whether or not -- whether they prove any hypothesis that is relevant to what the Judge has to decide in this case.
A. Yes.
Q. So I don't think anyone will mind if I summarize that studies have been done with rodents in which they are trained to hit a certain lever if they detect THC as opposed to saline solution --
A. Yes.
Q. -- correct?
Are studies -- can a study be developed, though, where a rodent would actually have the opportunity to see if it could discriminate between THC and XLR-11?
A. Yes.
Q. And are you aware of any studies that have been done in that regard?
A. Not for THC and XLR-11.
Q. Okay. So the state of the scientific record as you have stud -- have you studied it --
A. Yes.
Q. -- have you looked?

The state of the scientific record right now, are there any studies that have been conducted which would, even in rodents, determine whether or not they react the same way to THC and XLR-11?

MS. LINEBERGER: Objection, he is not a pharmacologist, Your Honor, he is a chemist.

THE COURT: Overruled.

A. No.

BY MR. LUBIN:

Q. Now, we do know that there are studies between when XLR-11 is substituted for THC.

A. Yes.

Q. Now, from a scientific method analysis, does that tell us whether or not that rodent is particularly relating XLR-11 as being the same as THC?

A. That does not -- that's not the correct interpretation.

Q. Okay. So why not?

A. Well, the rodent is trained to press one lever for -- and I'll make this brief because I know we heard it before. The rodent is trained to press one lever if given THC, a different lever if given saline. Then the rodent is given, in this case, for example, XLR-11 and the rodent needs to press one or the other lever in order to get food.

So essentially, what the rodent is saying when it chooses the THC lever is that what it is experiencing is more

like THC than it is like saline, but it doesn't necessarily mean that what it is experiencing is substantially similar to what it has experienced with the THC training drug.

Q. Is there anything in the literature or the research that you have reviewed which would indicate that XLR-11 has similar effects as THC on the human body?

A. No.

Q. And is there anything in the literature which would say that its potency is similar, or less similar, or more similar than THC?

A. No.

Q. Is there anything in the research that has been presented available for us to find that would in any way indicate that THC and XLR-11 are closely related?

A. No.

Q. Now --

A. Depending on your definition of closely, I suppose, but not by mine.

Q. Okay. Now, I'm not asking you for, you know, your pharmacological opinion on this, I'm just asking for what the facts are and what the research shows.

But in terms of an analysis of whether or not XLR-11 is similar to or should be compared to, for guidelines purposes, THC or whether it should be compared, for guidelines purposes, to marijuana, what does the evidence support?

MS. LINEBERGER: Objection, he is not qualified to evaluate it, Your Honor.

THE COURT: Overruled.

A. To try to distinguish here between THC and marijuana is kind of splitting hairs. The -- so no -- I'm sorry, could you repeat the question.

BY MR. LUBIN:

Q. Why is it splitting hairs to try to distinguish between THC and marijuana, why?

A. The cannabinoid receptors, the substance of interest originally is marijuana, it's hard to study marijuana. It's -- what is typically done is various components of marijuana. For example, THC might be studied in order to gain a better understanding of marijuana pharmacology. To differentiate somehow between THC and marijuana is -- like I said, at best, it is splitting hairs.

Q. Let me just ask it in a different way.

THC is the psychoactive ingredient in marijuana, correct?

A. It is widely recognized as the primary active ingredient, psychoactive ingredient yes.

Q. When people use marijuana and they get high, they are getting high because of the THC?

A. That's the consensus, yes.

Q. And so -- but marijuana, of course, is separately listed as

a schedule one drug, correct?
A. Yes.
Q. And is marijuana then, in your opinion, appropriate or inappropriate to do the comparison with XLR-11?
A. Given that one must choose one of the substances from the guidelines, I think marijuana is appropriate.
Q. In other words, if you have to choose something to compare it to make up a guideline level, your opinion would be that marijuana would be the closer one?
A. My opinion is that marijuana is appropriate, yes.
Q. Is appropriate, okay.
You had mentioned something about a Coke-Pepsi test.
A. The Pepsi challenge.
Q. The Pepsi challenge?
A. Yes.
Q. Does that have relevance here to what you think could be done in terms of, you know, further scientific testing?
A. It's an analogy to a side-by-side comparison.
Q. What --
A. In the Pepsi challenge, Pepsi was interested in the answer to the question of whether people would prefer the taste of Coke or Pepsi tasted side by side. And so the way they did this experiment is they gave people a sip of one soda, and then gave someone a sip of the other soda and, presuming they could tell them apart, asked which one they liked better and -- well,

if you remember the marketing campaign, most people chose Pepsi.
Q. Is that the test that you feel could be developed, even if it is with animals, as to kind of comparing THC to XLR-11?
A. If the question -- if one wanted to answer the question whether XLR-11 were substantially similar, such that the rodent could not tell it apart from THC or ask the question as to whether the rodent would determine it to be more similar to THC or to marijuana, then you would design the drug discrimination experiment differently.
You would use, for example, a three-choice drug discrimination study, where you would give the rodent two choices as to the drug in addition to saline.
Q. And the two choices would be, for example, marijuana and XLR-11, is that --
A. For example, you might, assuming that one could train a rodent to differentiate marijuana and THC, and it is not clear that that distinction could be done, but presuming that there is a significant pharmacological difference between those two substances, then you can train a rodent to recognize THC or recognize marijuana; press one lever if given THC, a different lever if given marijuana, and then a third lever for saline, then give the rodent XLR-11 and ask -- see which lever the rodent presses.
Q. And would the hypothesis then be closer to being proven if

you set up a test like that?
A. I think that would be much stronger evidence in support of the pharmacological -- the differential pharmacological affects in the rodent.
Q. One way or the other.
A. One way or the other.
MR. LUBIN: Thank you, Doctor. I'm going to turn you over to someone else to question.
THE COURT: Let me ask you the same question I have asked these other two experts.
Do you know -- the equivalency table here in the guideline book has one gram of THC is the equivalent of 167 grams of marijuana, do you know any scientific basis or rationale for that?
THE WITNESS: I do not.
THE COURT: Does it make any sense to you?
THE WITNESS: It does not.
THE COURT: We heard one doctor say, well, THC is 15 to 20 percent of marijuana, so he thought if you were going to do a ratio between pure THC and marijuana, you would use either 1 to 5 or 1 to 7. Does that make sense or is that --
THE WITNESS: I think the statement -- that particular statement in isolation, one gram of THC equals X grams of marijuana, the way I would go about coming up with X would be to ask how much THC is present in marijuana; and if it

took 10 grams of marijuana -- if you had to compile, collect 10 grams of marijuana in order to extract out and isolate, in total, one gram of THC, that would be a THC content of 10 percent. Then I would fill in that X with 10 grams of marijuana, if that makes sense.

THE COURT: I guess that would ignore any impact the remaining ingredients of marijuana might contribute.

THE WITNESS: Yes, that would be focusing specifically on the THC content of the marijuana.

THE COURT: But what you are saying is basically, since THC is the operative ingredient in marijuana, it doesn't make any sense to look to THC as the more appropriate guideline ingredient; although I guess to the degree XLR-11 is a simple -- is a single synthetic drug, at least it would be -- it wouldn't have these other ingredients that marijuana has.

THE WITNESS: So to the extent that XLR-11 is similar to marijuana, it would be similar to THC and vice versa, I don't --

THE COURT: You don't think it is similar to either one necessarily.

THE WITNESS: That is correct, I don't think it's substantially similar in terms of its pharmacological effects.

There is no evidence that I have seen that would support the conclusion that, in humans, that the effects are substantially similar on the central nervous system.

In terms -- in terms of how these two substances would bind to the cannabinoid receptors, it doesn't make sense that they would bind in the same way because the structures are so different. They may bind to the same receptor, they may bind to the same place in the same receptor, but I don't see how they would bind equivalently or substantially similarly. Indeed, I think we heard testimony that the effects of these substances are different, so --

THE COURT: So you don't think either marijuana or THC should be looked to in determining the appropriate calculation?

THE WITNESS: Well, so I wouldn't say that either one of them are substantially similar in terms of the structure of the pharmacological effects. One still needs to identify the most comparable substance.

When you are asked to identify what is the most comparable substance, some of the things that you can consider include -- some things that you should consider include is there a substance that is substantially similar in chemical structure, pharmacological effects, and potency.

I would say that there is not a particular substance that satisfies those criteria and the most comparable -- so you wouldn't use those criteria per se, you would then look at what -- sort of a bigger picture; what is the most comparable substance to the substances in question in this case.

THE COURT: Well -- and so why do you come up with marijuana; because it is leafy? I mean, what --

THE WITNESS: From reading the presentence report, the presentence report describes XLR-11 in the context of smokeable synthetic cannabinoid products that are designed to mimic marijuana and that users report effects similar to marijuana.

I don't think that the comparison to marijuana is necessarily better or worse than the comparison to THC scientifically because, again, THC is typically studied in order to understand better the effects of marijuana. There are studies where people have asked this question and looked at the effects of THC compared to the effects of marijuana and, in general, the conclusion is that they are approximately equal.

THE COURT: Okay. Cross-examination.

CROSS-EXAMINATION

BY MS. LINEBERGER:

Q. Good afternoon, Dr. Dudley.

A. Good afternoon.

Q. Dr. Dudley, you review papers in medical and organic chemistry; is that correct?

A. Medicinal chemistry and organic chemistry and general chemistry journals.

Q. Why did these journals ask you to review papers for them?

A. To make sure -- well, for -- it's the peer review process.

When someone submits a paper to a peer review journal, they send it out to people that the editors regard as experts in the field to ask for those people -- in this case, myself -- to weigh in on the validity of the studies, the quality of the experiments, and also the potential impact of the work to help guide the editors in their decision as to whether or not this particular publication might be suitable for their journal.

Q. What pharmacological journals have you reviewed papers for?

A. So the medicinal chemistry journals are papers that include chemistry and pharmacology, primarily the binding assays and functional assays in some cases.

Q. Perhaps you didn't understand my question. What pharmacological journals have you specifically reviewed for?

A. So if you are excluding medicinal chemistry from the field of pharmacology, then none, but I don't exclude pharmacology from the field of medicinal chemistry. The field of medicinal chemistry encompasses what most people would regard as chemistry and pharmacology.

Q. Now, your declaration says you are an organic chemist with professional expertise in synthetic chemistry, molecular pharmacology, medicinal chemistry, chemical structure, molecular interactions, and structure activity relationships. Molecular pharmacology and behavior pharmacology are different, are they not?

A. They -- so -- yes.
Q. In respect to CB1 and CB2, even though you stated XLR-11 binds to CB2 receptors, does that mean that it is not binding to CB1?
A. No, it does bind to CB1.
Q. And isn't something that binds to CB1 -- if something binds to CB1, what would be the expected effect in a human?
A. Presuming that it binds to CB1 --
Q. Yes, that's the question.
A. -- in the brain --
Q. Yes.
A. -- then -- and it produces an agonist functional response, then you would anticipate psychotropic effects similar to that of marijuana.
Q. I'm sorry?
A. Then you would anticipate psychotropic effects similar to that of marijuana.
Q. You did hear Dr. Cozzi say that it binded with CB1, didn't you?
A. It does bind to CB1.
Q. You heard him say that, Dr. Cozzi, didn't you?
THE COURT: All three of them have said that, as I heard them.
You said that, too, right?
THE WITNESS: I said that it binds to CB1. I don't

specifically recall Dr. Cozzi saying that, but I don't doubt that he did, and I don't doubt that he recognizes that as well, that it binds to CB1.

BY MS. LINEBERGER:

Q. So if XLR-11 binds to CB1 and CB1 gets you high, then we can deduce that XLR-11 will get the consumer of XLR-11 high as well; isn't that correct?

A. Assuming that XLR-11 gets into the brain.

THE COURT: I don't understand that, why is there a question? Because you said receptors are in the brain, why is there an issue as to -- I think Mr. Lubin suggested it might not get to the brain. Does it or not, do you know, or can anyone know?

THE WITNESS: We don't know it gets to the brain. You know, certainly, I think a lot of the testimony is predicated on an assumption that it gets to the brain, but getting -- getting a substance into the brain is not a guarantee.

Ingesting a substance does not guarantee that it will cross from the blood through what is called the blood/brain barrier and get into the brain; and that crossing the blood/brain barrier is a necessary -- is a requirement for the psychotropic effects that we are talking about from the -- that are associated with marijuana.

THE COURT: So the CB1 receptors -- I think you said

they are in parts of the body, other than the brain, as well.

THE WITNESS: It is thought that there are CB1 receptors outside of the brain. The CB1 receptors that -- when you are assessing whether or not a substance binds to CB1 in vitro, you are looking at CB1 that is certainly outside of the brain, that is in a test tube, but there are substances.

There is one particular synthetic cannabinoid that I'm thinking of, CB13, that binds to the CB1 receptor, but does not cross the blood/brain barrier, and so has been ruled out of producing marijuana like psychotropic effects.

THE COURT: How can you test for whether it does cross that membrane or barrier?

THE WITNESS: That, actually, I do not recall offhand. I apologize.

BY MS. LINEBERGER:

Q. Doctor, you don't think 18 through 29-year-olds are smoking XLR-11 because they have arthritis, do you?

A. I'm not articulating a hypothesis one way or the other.

Q. You are not?

A. I'm saying that the data that I have seen --

Q. What is the data that you have seen, by the way?

A. -- does not support the conclusion that it has these effects in humans.

Q. What data are you talking about?

A. The data that we have been discussing here today; the

binding affinities to -- to the CB1 and CB2 receptors, the functional assays, the drug discrimination studies in mice.

I think all of these data are useful and give us information about the pharmacological effects, the properties of XLR-11, and those studies, those data would allow us to formulate a hypothesis regarding the pharmacological effects in humans. You would then do the experiment and draw conclusions about the pharmacological effects in humans based on those experiments.

Q. Oh, the Coke and Pepsi challenge. Is it ethical to give XLR-11 to humans?

A. That wouldn't be my decision. I think we have heard testimony on both sides of that -- well, as to specifically the ethics, you know, I have never --

Q. You are aware that people have died, aren't you?

MR. LUBIN: He was in the middle of finishing a sentence, Your Honor. I'm asking he be allowed to finish it.

THE WITNESS: I don't have a -- I don't have an opinion on the ethics of testing XLR-11 in particular on people.

BY MS. LINEBERGER:

Q. Well, since you have read studies, you have read studies that people have died. Are you going to give it to somebody that died?

What is your opinion?

A. My opinion is that substances like XLR-11 have value to the research community in helping us understand better the chemistry of the pharmacology of marijuana, of understanding better the CB1 and CB2 receptors. And as to whether it is an appropriate to conduct clinical trials on a schedule one substances, I don't have an opinion on that.
Q. So you won't tell this Court whether or not you would give it to an adult? You still won't form an opinion no matter what, will you?
A. Not right here, right now.
Q. Well, how many people do you need to die before you form an opinion?
MR. LUBIN: Object to form.
THE COURT: Sustained.
BY MS. LINEBERGER:
Q. You are aware of the articles, the numerous articles covering the adverse health effects of XLR-11 and the other synthetic cannabinoids the Defendants are responsible for. You are aware of those studies, aren't you, you read them?
A. The studies discussed here today, yes.
Q. And those are by actual pharmacologists, aren't they?
A. I couldn't say whether they all consider themselves pharmacologists, I don't know.
Q. Do you feel it was appropriate to schedule XLR-11?
A. I do.

Q. Why?
A. Based on the data that was presented here today, I don't -- I'm not -- it's not my opinion that XLR-11 should not be a controlled substance.
Q. So you agree it should be a schedule one then?
A. I agree it should be schedule one.
Q. And you are aware that there are no legitimate uses for it, which is why it is in schedule one.
A. There are no approved uses in humans. There is no medically approved use for XLR-11 in humans. I would disagree there is no use for it.
Q. Certainly you can test rats, but there is no legitimate use for it in humans, correct?
A. There is no FDA approved medical use for XLR-11 in humans.
Q. Would you use it?
A. No.
Q. Would you give it to a friend?
A. No.
I'm sorry, I assume you mean would I use it on myself.
Q. Yes.
A. As opposed to --
Q. Would you use it?
A. No.
Q. Would you personally want to be responsible for conducting

a clinical trial using humans and XLR-11 or any of the synthetic cannabinoids that these Defendants are responsible for importing?

A. Not starting one today. I would be interested or --

Q. Would you be want to be responsible?

THE COURT: Let him finish.

THE WITNESS: I don't want to commit myself to work on a particular study down the road at some point, but I think further study on synthetic cannabinoids is warranted.

I think there is potential medical value from synthetic cannabinoids, particularly ones that modulate CB2 selectively over CB1, and can teach us how to bettor modulate CB2 activity over CB1.

I think many of the substances that -- well, in particular, XLR-11, that's the one I focused on here, has value in that regard. But it would not make sense to start a clinical trial with humans today aimed at a -- getting out the approval for medical use of XLR-11.

BY MS. LINEBERGER:

Q. So your answer, to boil it down, is no, you would not want to be responsible for a clinical trial using humans testing XLR-11.

A. Starting today, aimed at generating an approved medical usage, no.

Q. You have previously testified that rodent tests are not

acceptable.
A. Not acceptable for what?
Q. But here, you changed your opinion and said that a three-lever test would be acceptable.
MR. LUBIN: Object to form, Your Honor.
BY MS. LINEBERGER:
Q. It is still a rat study, isn't it?
THE COURT: Sustained.
Start your question without what he previously testified about, unless you have something you are pointing at. I didn't hear any of that in his direct, so the form of your question, I sustain the objection.
BY MS. LINEBERGER:
Q. It is your opinion that you need a three-lever study with rats; is that correct?
A. What I testified to under direct is that a three-lever study would be more informative.
Q. Saline, XLR-11 and THC, is that what you said?
A. For example, if -- that would be a three-lever study. I don't know what the test drug would be in that design that you just mentioned.
Q. I want to take a look at something you wrote in your declaration.
You state, in paragraph nine, at subparagraph B, With respect to count one, nothing in the presentence investigation

report indicates intent or capability to synthesize XLR-11 from simpler chemical building blocks by chemical synthesis.

You are aware that the Defendants imported this as a powder from China, aren't you?

A. Yes, that's what I read in the presentence report.

Q. And that's where the chemical gets made, in China, correct?

A. That's my understanding from the presentence report, yes.

Q. And when the chemical is made in China, that's when whatever synthesization of these synthetic cannabinoids happens, correct?

A. Yes.

Q. You are not calling the combination of the pure synthetic cannabinoid powder that these Defendants import from China, you are not calling what they lace it on, the vegetable matter, you are not calling that synthesis, are you?

A. That's not what I was referring to in terms of chemical synthesis.

Q. It comes already synthesized, correct?

A. Correct.

Q. By a chemist, like yourself.

A. By a chemist with, yeah, expertise, competency in chemical synthesis, yes.

Q. And you agreed that the substances that -- you read the entire PSR, correct?

A. Yes.

Q. The substances listed in the PSR are 100 percent pure synthetic cannabinoid chemicals coming from China, correct?
A. Well, for a first approximation, 100 percent purity, the substance is as ordered from China and delivered presumably are high purity single substances.
Q. And when you reference that they are smoked like marijuana, that's just their manner of ingestion, you agree to that, right?
A. Yes.
Your questioning of this statement in paragraph nine, I think that was triggered by the count two, the intent to manufacture XLR-11, that's just to clarify that they weren't actually -- I wasn't referring to the chemical synthesis of XLR-11.
Q. You didn't read the crimes code in your preparation for this, correct?
A. I'm sorry, what is the crimes code?
Q. The charge in here, possession -- manufacture, possession with intent to distribute, you are talking about manufacture from a chemical chemistry standpoint, not a manufacturing, when somebody puts the pure product on another product, mixes it together, that that's also considered manufacturing?
A. Right. That manufacturing refers to the smokeable synthetic cannabinoid product, the synthetic marijuana, if you will, as opposed to the chemical synthesis of XLR-11.

Q. You say synthetic marijuana. The correct term is synthetic cannabinoid, correct?
A. Well, XLR-11 is a synthetic cannabinoid. The manufacture, the chemical synthesis of XLR-11 took place in China, it was brought in. I think the manufacture that was referred to here was of the smokeable synthetic cannabinoid product, after the addition to the leafy material.
Q. People like to say it is synthetic marijuana because you smoke marijuana, too, right?
A. Sure.
Q. AB-FUBINACA and AB-CHIMINACA both came from a 2009 patent from Pfizer; is that correct?
A. I don't dispute that.
Q. You read that?
A. I believe I read that. I don't have that particular fact off the top of my head, but that sounds familiar.
Q. And they own those two drugs officially.
MR. LUBIN: Objection, outside the scope and irrelevant.
MS. LINEBERGER: Your Honor, it tests his knowledge as an expert.
MR. LUBIN: He has testified only about XLR-11.
THE COURT: I'll permit him to answer, if he can. I'm not sure it has to do with this, if it is helpful to your examination, but go ahead.

A. I have -- unrelated to this case, I have read on other synthetic cannabinoids, including AB-FUBINACA and also AB-PINACA.

The names are admittedly hard to keep straight, but my recollection is that what you said regarding AB-FUBINACA and AB-CHIMINACA is -- well, what I recall off the top of my head from reading from another case, AB-FUBINACA and AB-PINACA were covered in Pfizer patents. That's my recollection, it is not something that I reviewed in recent days.

BY MS. LINEBERGER:

Q. They only asked you to look at XLR-11 and not the other synthetic cannabinoids contained in the relevant conduct of these Defendants?

A. Yeah, that's right.

Q. Okay. Why do you think Pfizer never followed through to get -- and do clinical trials to get this approved by the FDA?

MR. LUBIN: Objection, irrelevant.

THE COURT: Overruled.

A. I don't know what Pfizer has done going forward with these compounds. It certainly could be that they have taken some of these compounds further than what they published in the literature.

It also certainly could be that the program was abandoned. For what reason was the program abandoned, I don't know.

BY MS. LINEBERGER:
Q. XLR-11, are you aware that XLR-11 was also covered by a similar patent by Abbott Labs? Did you also read that in your reviews as a chemist?
A. I have read that.
Q. Why do you think they never followed through with additional research to get it approved by the FDA?
A. They actually did follow through with additional research on a different substance. I do not know how far that research went, but the original studies from Abbott did not actually include specifically XLR-11.
Q. That's what my question included, XLR-11. I know you like to go off on tangents, but let's try to focus --
THE COURT: Ms. Lineberger, confine yourself, please. That's improper, as you know.
You are the one that's been asking about these other drugs, not him, so I don't know how you can accuse him of going on tangents.
Go ahead and finish your answer, if you like.
THE WITNESS: In the published literature, XLR-11 is not included in what they have published. Presumably, it is covered within the scope of the patent. They investigated a number of tetramethyl cyclopropylcarbinyl indoles for their ability to modulate CB2 over CB1. They chose one candidate, that I'm aware of, to go forward, and I don't know what

happened with those additional studies. I did not follow it.
BY MS. LINEBERGER:
Q. Is XLR-11 even an indole?
A. Yes.
Q. Do you disagree that XLR-11 has adverse effects?
A. It certainly seems, from the testimony that we have seen today, that there are adverse effects associated with XLR-11 use.
Q. And you agree they are serious adverse effects, don't you?
A. Yes, yes.
MS. LINEBERGER: No further questions.
THE COURT: Is there redirect?
MR. LUBIN: I don't have any questions -- oh, I do have a question, just one.

REDIRECT EXAMINATION

BY MR. LUBIN:
Q. From a scientific point of view, does a ratio of 167 to 1 make sense for -- based upon your knowledge of XLR-11?
A. No.
Q. Why not?
A. I don't know where that number comes from for THC. I don't know -- I don't understand the basis for that number.
Q. Does the analysis that was testified to earlier make sense, where you look at the percentage of THC in marijuana and, at most, apply the same percentage?

A. That is -- that makes sense to me. I think that is a reasonable approach.

MR. LUBIN: I have no further --

Do I have a question?

BY MR. LUBIN:

Q. Regarding the final line of questions that Counsel asked you about, adverse effects, from a scientific point of view, do we know whether or not it does truly have adverse effects or whether there were other factors involved?

A. The coroner reports, the case studies from hospitals give us information as to the association, that these cases -- whatever the patient presented with, there was an association to XLR-11. The cause and effect relationship, that's not clear.

Q. By association, you mean it was around, but you don't know whether or not that's what caused the effect.

A. Right. I think circumstantial would be the term, yeah.

MR. LUBIN: Thank you. No further questions.

THE COURT: Okay. Thank you, Doctor.

Does that cover all of our scientists and experts?

(Witness excused.)

MS. LINEBERGER: It looks like it covers it from a prosecution point of view.

THE COURT: It's 5:00 o'clock. I want to make sure, if you have somebody here, we get to hear from them.

I'm not crazy about it, but it sounds like that the lawyers' schedules are such that I cannot get this finished next week or the following week. I would prefer to do that.

It looks unlikely because I do try to -- I mean, I didn't give you any notice that I wasn't going to finish all of this today, so I will have to live with your schedules.

Let me ask however many of you there are to get with Ginny, and you all figure out a time. Sounds like it is January, but you all get together, pick a date.

How much longer do you think you need?

MS. LINEBERGER: Probably half a day.

THE COURT: Do you agree?

MR. LUBIN: Yes.

MR. SCHELLER: Yes, Your Honor.

THE COURT: You all get together with Ginny.

In the meantime, all three experts could not point to why the 167 to 1 makes sense, I don't think anybody gave me a rationale for that.

I think you said the Sentencing Commission came up with it, you don't know how they did it. If anybody can figure that out and wants to provide me something else on that.

As I understand it, I mean, the only reason you all are pushing for THC is to be able to use the 167 to 1. Is there any other advantage to it?

MS. LINEBERGER: Your Honor, the reason why we are

using THC is because that's the closest thing in the list and because it is the closest thing in the list, it is 167. If it was 400, it would still be THC.

THE COURT: Well, all right.

MS. LINEBERGER: Your Honor --

THE COURT: For me to use that guideline, I mean, the 167, there a has to be some rationale for it.

MS. LINEBERGER: Your Honor, I believe that's what the Sentencing Commission --

THE COURT: Well, all I'm doing is inviting you, if you can find something else and want to give it to me, go ahead.

MS. LINEBERGER: Yes, Your Honor.

THE COURT: Because I need to understand where on earth they came up with it. The fact that it is on page 140 or whatever it is, doesn't seem like that's enough.

MS. LINEBERGER: Yes, Your Honor.

MR. SCHELLER: For the record, I have used -- two of my employees are ex federal law clerks, and they haven't been able to find where the ratio came from, so I guess that's a commentary on federal law clerks.

THE COURT: I'm not sure what that's a commentary on.

MS. LINEBERGER: It sounds like he is talking about federal law clerks to me, Judge.

MR. SCHELLER: I just want to put on the record, make

the Court aware that there were a number of people that came in support of my client. They are sitting in the courtroom, they have been here all day. It goes obviously to 3553 factors in terms of the support he has.

THE COURT: I have read the letters and things like that. I mean, what do you want to do, just introduce them or they can come back whenever the date you all come up with, too.

MR. SCHELLER: They may not be back, and what I'll do is I'll do a notice of people here today, I'll file that. They were sitting -- they were all sitting back there.

THE COURT: Good, good.

And I read all of the letters and if you all have somebody you want to -- I will try to make sure I have all of the information you want to provide.

MR. SCHELLER: I can put their names on the record right now, without having them introduced.

THE COURT: Whatever, go ahead.

MR. SCHELLER: So in support of my client in the courtroom was Mohammed Abu Sayed; Rashida Begum, B-E-G-U-M; Sumiara, S-U-M-I-A-R-A; Ramisa, R-A-M-I-S-A, Kabir, K-A-B-I-R; George Hill; Kimberly Hill; Pastor Gregory Hill; Carol Strozier; Thelma Hill; and Tony Gunn; Lasheka Ingram; and Tameaka Ingram.

Would you all stand up.

They are here today in support of my client, Your

Honor. Thank you.

THE COURT: I hope everyone has a good weekend.

MR. SCHELLER: Thank you.

THE COURT: Obviously, make sure they know when you are going to continue this so if they choose to come back, they can.

MR. SCHELLER: I appreciate you letting me introduce them.

THE COURT: Have a good day.

(PROCEEDINGS ADJOURNED AT 4:54 p.m.)

C-E-R-T-I-F-I-C-A-T-E

I hereby certify that the foregoing is an accurate transcription and proceedings in the above-entitled matter.

12/21/2015 ***/s/DIANE MILLER***
DATE

DIANE MILLER, RMR, CRR
Official Court Reporter
United States District Court
701 Clematis Street, Room 259
West Palm Beach, FL 33401
561-514-3728

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15-2070-cr

United States Court of Appeals for the Second Circuit

UNITED STATES OF AMERICA,

Plaintiff-Appellee,

v.

ABDELMAJI K. LABABNEH,
aka Abu Khalaf, aka David,

Defendant-Appellant.

ON APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF NEW YORK

BRIEF OF *AMICUS CURIAE* NATIONAL ASSOCIATION OF CRIMINAL DEFENSE LAWYERS IN SUPPORT OF DEFENDANT-APPELLANT AND REMAND

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Amicus curiae National Association of Criminal Defense Lawyers ("NACDL") submits the following corporate disclosure statement, as required by Federal Rules of Appellate Procedure 26.1 and 29(c)(1): NACDL is a nonprofit corporation organized under the laws of the District of Columbia. It has no parent corporation, and no publicly held corporation owns ten percent or more of its stock.

Dated: New York, New York
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INTEREST OF *AMICUS*[1]

Amicus National Association of Criminal Defense Lawyers ("NACDL") is a nonprofit voluntary professional bar association that works on behalf of criminal defense attorneys to ensure justice and due process for those accused of crime or misconduct. It has a membership of approximately 9,000 members in 28 countries and 90 state, provincial, and local affiliate organizations, totaling up to 40,000 attorneys. NACDL and its members are dedicated to advancing the proper, efficient, and fair administration of justice, including ensuring that criminal sentencing statutes are construed and applied in accordance with due process. NACDL submits this brief to provide this Court with a more comprehensive understanding of the scientific, legal, and policy issues surrounding the appropriate treatment of synthetic marijuana under the United States Sentencing Guidelines.

SUMMARY OF ARGUMENT

The Sentencing Guidelines endorse a 1:167 ratio for converting quantities of Tetrahydrocannabinol (often dubbed "THC") to marijuana for sentencing purposes—a ratio that the government now urges this Court to apply in converting

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[1] Pursuant to Federal Rule of Appellate Procedure 29, counsel for *amicus* represent that they authored this brief in its entirety and that none of the parties or their counsel, nor any other person or entity other than *amicus* or its counsel, made a monetary contribution intended to fund the preparation or submission of this brief. Notice of intent to file this brief was provided to the Appellant and the Appellee, and no party opposes the filing of this brief.

quantities of synthetic marijuana to marijuana. Because this ratio lacks a sound empirical basis, *amicus* respectfully urges this Court to redress its inequitable effects on the growing number of synthetic marijuana offenders. And while the particular sentencing disparities involving synthetic marijuana are new, the policy problems they present are not—calling to mind the baleful effects of the unjustified 1:100 crack-to-cocaine sentencing ratio, which Congress eventually reduced in the Fair Sentencing Act of 2010.

Application of the 1:167 ratio to synthetic marijuana similarly lacks proper scientific support or other sound policy basis. As one district court recently reasoned in declining to apply the ratio at sentencing:

> In considering the THC to marijuana ratio, I find it troubling that there does not seem to be any reason behind the 1:167 ratio. Although I asked each of the experts at the hearing, no one could provide me with a reason for this ratio, which has major implications in determining the base level offense. After my own research and a phone call to the Sentencing Commission, I still could find no basis for this ratio. It appears to have been included in the first set of Guidelines in 1987, with no published explanation. While a sentence must reflect the seriousness of the offense to provide just punishment, a sentence based on a range that seems to have no cognizable basis is not just.

United States v. Hossain, No. 1:15-cr-14034, 2016 WL 70583, at *5 (S.D. Fla. Jan. 5, 2016). Yet most courts appear to apply the ratio to synthetic marijuana offenses without scrutiny, perpetuating inequitable treatment of defendants.

In the instant case, although the district court imposed a below-Guidelines sentence for a combination of reasons, it may not have fully recognized its

discretion to deviate from the 1:167 ratio. As the Supreme Court recognized in *Kimbrough v. United States*, 552 U.S. 85 (2007), district courts may deviate from such a ratio because they disagree with the ratio's policy rationale and because the ratio leads to sentences "greater than necessary" to accomplish the purposes of sentencing articulated in 18 U.S.C. § 3553(a). Accordingly, *amicus* respectfully urges this Court to remand the case for further proceedings. At that juncture, the district court can develop a record on which to evaluate whether further deviation from the Guidelines is warranted by the ratio's lack of scientific or other reasoned basis. Should this Court decide that remand is not proper—on procedural or other grounds—*amicus* respectfully urges the Court to reserve judgment on the 1:167 ratio's validity until a more fully developed record comes before it.

ARGUMENT

I. SENTENCING FOR SYNTHETIC MARIJUANA OFFENSES PRESENTS NEW AND GROWING POLICY CHALLENGES.

Application of the Sentencing Guidelines to synthetic marijuana poses novel—and increasingly significant—legal, scientific, and policy questions. Synthetic marijuana is a relatively new substance, and one only recently added to the federal list of Schedule 1 controlled substances.[2] XLR-11, the synthetic

[2] Unlike organic marijuana, "synthetic cannabinoid" or "synthetic marijuana" is comprised of man-made chemicals that mimic the effects of THC, one of the active ingredients responsible for producing many of marijuana's physiological

(cont'd)

marijuana substance at issue in this case, first appeared on the list in May 2013—shortly before defendant-appellant was arrested.

Despite their novelty, synthetic marijuana substances appear to be a law enforcement priority. In January 2014, the U.S. Drug Enforcement Administration ("DEA") launched an initiative targeting the possession and distribution of synthetic drugs, leading to over 150 arrests in 29 states within several months. *See* U.S. Drug Enf't Admin., *DEA News: Huge Synthetic Drug Takedown, Project Synergy Phase II continues attack on drug networks, sources of supply, global money flow* (May 7, 2014), http://www.dea.gov/divisions/hq/2014/hq050714.shtml. This focus appears to persist: In September 2015, the DEA, Department of Homeland Security, New York Police Department, and New York City Sheriff's Office raided 80 locations throughout New York City, indicting and arresting a number of individuals in connection with synthetic marijuana. *See* Joe Valiquette et al., *10 Indicted, 80 Locations Raided in Biggest Synthetic Pot Crackdown in New York City History: Officials*, NBC N.Y. (Sept. 16, 2015), http://www.nbcnewyork.com/news/local/Synthetic-Marijuana-Pot-Crackdown-

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and psychological effects. *See* Office of Nat'l Drug Control Policy, *Synthetic Drugs (a.k.a. K2, Spice, Bath Salts, etc.)*, https://www.whitehouse.gov/ondcp/ondcp-fact-sheets/synthetic-drugs-k2-spice-bath-salts (last visited Mar. 30, 2016).

New-York-City-Bodega-Raid-Store-Cannabinoids-Arrest-327864341.html; *see also* Indictment, *United States v. Deiban*, No. 15-cr-00554-TPG (S.D.N.Y. Sept. 10, 2015), ECF No. 2.

Yet synthetic marijuana is absent from the Sentencing Guidelines' Drug Quantity Table, which recommends a base offense level for weight-based quantities of certain controlled substances. *See* U.S. Sentencing Guidelines Manual § 2D1.1(c) (U.S. Sentencing Comm'n 2015) ("U.S.S.G."). A court must, therefore, convert a quantity of synthetic marijuana into a corresponding quantity of its organic counterpart. U.S.S.G. § 2D1.1 cmt. n.6. This ordinarily involves two steps: First, the court must identify the listed substance to which synthetic marijuana is "most closely related." *Id.* Second, using the appropriate conversion ratio in the Guidelines, the court must convert the quantity of the most closely related substance into a quantity of marijuana. U.S.S.G. § 2D1.1 cmt. n.8(A). The Guidelines offer the following conversion ratios for marijuana-related substances:

> 1 gm of Marihuana/Cannabis . . . = 1 gm of marihuana
> 1 gm of Hashish Oil = 50 gm of marihuana
> 1 gm of Cannabis Resin or Hashish = 5 gm of marihuana
> 1 gm of Tetrahydrocannabinol, organic = 167 gm of marihuana
> 1 gm of Tetrahydrocannabinol, synthetic = 167 gm of marihuana

U.S.S.G. § 2D1.1 cmt. n.8(D).

In cases involving synthetic marijuana, the government has generally taken the position: (1) that synthetic marijuana is more similar to Tetrahydrocannabinol

(or "THC") than to any other enumerated marijuana substance; and (2) that synthetic marijuana is subject to the Guidelines' 1:167 THC-to-marijuana ratio. Accordingly, the government has advocated treating one gram of synthetic marijuana like 167 grams of regular marijuana for sentencing purposes. As prosecutions for synthetic marijuana accelerate, judicial scrutiny of this conversion ratio is becoming increasingly critical to protecting the rights of criminal defendants.

II. THE SCIENTIFIC BASIS FOR THE GOVERNMENT'S PROPOSED 1:167 CONVERSION RATIO IS HIGHLY QUESTIONABLE.

The 1:167 ratio lacks scientific and empirical support and was never intended to apply to synthetic marijuana. By seeking to apply this ratio, the government also implies that synthetic marijuana is most similar to THC—an assumption with, at best, inconclusive support.

A. The 1:167 Ratio Lacked Scientific Basis When Promulgated and It Does Not Conform With Current Experience.

As one court recently determined, the Sentencing Commission's initial use of a 1:167 ratio in 1987 to convert THC to marijuana did not appear to rest on scientific or other evidence. *See Hossain*, 2016 WL 70583, at *5 ("After my own research and a phone call to the Sentencing Commission, I still could find no basis for this ratio. It appears to have been included in the first set of Guidelines in 1987, with no published explanation."); *see also id.* (finding it "troubling that there

does not seem to be any reason behind the 1:167 ratio"). Nor did the 1:167 ratio accurately reflect the level of THC contained in marijuana during the 1980s, when the ratio was first adopted. *See, e.g.*, Mahmoud A. ElSohly et al., *Potency Trends of Δ^9-THC and Other Cannabinoids in Confiscated Marijuana from 1980-1997*, J. Forensic Sci. 24, 25-26 (2000), *available at* http://www.datia.org/datia/resources/-potencytrends.pdf. Because marijuana's THC potency was then approximately 3%, the 1:167 ratio—even at its inception—misstated the amount of THC within marijuana by a factor of five. *See id.* at Table 2. Moreover, the ratio's promulgation predates the development of synthetic marijuana, so the Sentencing Commission did not give the substance any reasoned consideration.

Today's experience appears to belie the 1:167 ratio. That ratio implies that marijuana has 0.6% THC content, but the accurate proportion appears to be significantly higher. While one court has recognized that current THC content could be 14%, *see Hossain*, 2016 WL 70583, at *6 (acknowledging expert testimony that "[w]e know from Government studies that the average THC content in marijuana today is over 14 percent"), some researchers suggest that THC concentration may be even higher. *See, e.g.*, Fernanda Alonso, *So What Exactly Is In Our Legal Pot?*, Georgetown Univ., O'Neill Inst. for Nat'l & Glob. Health L. (Mar. 26, 2015) ("What the samples have shown is that THC levels have risen markedly, to up to 30%. . . . [S]ome labs in Washington have seen THC levels as

high as 40%."), http://www.oneillinstituteblog.org/so-what-exactly-is-in-our-legal-pot/. In response to expert testimony that estimated the accurate conversion ratio for synthetic marijuana at 1:7—not 1:167—one court recently adjusted a defendant's sentence accordingly, reflecting a sentence "more reasonable than the sentence that the Government suggest[ed] . . ., based off the 1:167 ratio." *Hossain*, 2016 WL 70583, at *6. Indeed, marijuana with very low THC-levels is likely not the product for individual use as a narcotic, but for industrial purposes in making hemp rope or cloth. *See generally Hemp Facts*, N. Am. Indus. Hemp Council, Inc., http://www.naihc.org/hemp-information/286-hemp-facts (last visited Mar. 30, 2016).

B. Whether XLR-11 Is Most Similar to THC Remains Questionable.

The 1:167 conversion ratio has been applied to XLR-11 and other forms of synthetic marijuana because the government maintains that these substances are most closely related—or equivalent—to THC, the conversion of which the Guidelines address. But this equivalency remains to be proven, and experts dispute the similarity of THC's and synthetic marijuana's pharmacological effects and potencies. In fact, XLR-11 and other forms of synthetic marijuana may be most similar to marijuana itself, such that a 1:1 conversion ratio would apply under the Guidelines.

Whether a substance is "substantially similar" to a controlled substance listed in the Guidelines is a factual question that sentencing courts must determine after considering the similarity between the two substances' (1) chemical structures; (2) pharmacological effects; and (3) potencies. U.S.S.G. § 2D1.1 cmt. n.6. Experts generally agree that the first factor is unhelpful in making an equivalency determination.[3] As a result, courts focus on the two remaining factors—pharmacological effects and potency—to determine whether a form of synthetic marijuana "most closely relates" to THC or to a different substance. *See, e.g.*, *Hossain*, 2016 WL 70583, at *2-4; *United States v. Ramos*, Nos. 15-1592, 15-1602, 2016 WL 497167, at *6-9 (8th Cir. Feb. 9, 2016) (as corrected Feb. 23, 2016).

With respect to the similarity of THC's and synthetic marijuana's pharmacological effects, experts remain divided. While government experts cite

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[3] *See, e.g.*, *United States v. Ramos*, Nos. 15-1592, 15-1602, 2016 WL 497167, at *7 (8th Cir. Feb. 9, 2016) (as corrected Feb. 23, 2016) ("[S]ynthetic cannabinoids do not have a chemical structure similar to either THC or marijuana."); *Hossain*, 2016 WL 70583, at *2 (acknowledging same). Indeed, there are many reasons why substances can be difficult to compare from a forensic analytical standpoint including, *inter alia*, the large number of potential chemical structures and inadequate accessibility to standards. *See United States v. Makkar*, 810 F.3d 1139, 1143 (10th Cir. 2015) ("[It is] an open question . . . what exactly it means for chemicals to have a 'substantially similar' chemical structure—or effect."); *United States v. Forbes*, 806 F. Supp. 232, 237 (D. Colo. 1992) ("The scientific community cannot even agree on a methodology to use to determine structural similarity.").

drug discrimination studies suggesting that "animals could not differentiate between XLR-11 and the THC," other experts question these results because "animal studies are not reliable predictors of what a drug will produce in a human being," *Hossain*, 2016 WL 70583, at *3 (citation omitted); *see also Brock v. Merrell Dow Pharms., Inc.*, 874 F.2d 307, 313-14 (5th Cir. 1989) (noting the "very limited usefulness of animal studies" in determining a chemical's toxicity and recounting expert testimony that "the only way to tell whether a substance [produces similar pharmacological effects] in humans is to look to the human experience"). Similarly, with respect to the potency of each drug, many experts question the government's use of studies that rely on animal trials, utilize unreliable sample sizes, or generate irreproducible results. *See, e.g.*, *Hossain*, 2016 WL 70583, at *3; *United States v. Malone*, 809 F.3d 251, 255 (5th Cir. 2015). At best, the evidence of the pharmacological effects and potency of THC and synthetic marijuana is inconclusive.

Notably, a critical evaluation of these two factors may reveal that the "most closely related controlled substance" to forms of synthetic marijuana is not THC—but organic marijuana itself. *See Malone*, 809 F.3d at 255 (recounting expert testimony that synthetic and organic marijuana are "consumed in the same way and . . . for the same effect."). Indeed, the DEA has taken a similar position as recently as 2011, concluding that synthetic cannabinoids produce "[p]sychological

effects . . . similar to those of marijuana." U.S. Drug Enf't Admin., *Drugs of Abuse, A DEA Resource Guide* 62 (2011), *available at* https://roar.nevadaprc.org/-system/documents/2167/original/NPRC.1862.DrugsOfAbuse2011.pdf?1399062058; *see also* U.S. Drug Enf't Admin., *2013 National Drug Threat Assessment Summary* 14 (Nov. 2013), http://www.dea.gov/resource-center/DIR-017-13%20NDTA%20Summary%20final.pdf (asserting that "[s]ynthetic cannabinoids give the abuser an effect similar to marijuana"). This would support a conversion ratio of 1:1.

In short, the balance of evidence reveals much uncertainty over the true chemical and proportional relationships among THC, marijuana, and synthetic marijuana. But, at a minimum, the 1:167 ratio appears to lack scientific or other empirical support.

III. THE GOVERNMENT'S PROPOSED 1:167 RATIO HAS NOT RECEIVED ADEQUATE JUDICIAL SCRUTINY.

The emerging challenge of sentencing synthetic marijuana offenders requires greater judicial attention. Although a district court "must include the Guidelines range in the array of factors" it considers in sentencing, the court "may determine . . . that, in the particular case, a within-Guidelines sentence is 'greater than necessary' to serve the objectives of sentencing." *Kimbrough*, 552 U.S. at 91 (recognizing district courts' discretion to deviate from the Guidelines based on

policy disagreements with them).[4] In the past five years, aspects of the synthetic marijuana conversion ratio have been raised in at least 25 federal district court cases—as well as before three courts of appeals—but have not consistently received detailed treatment.

To date, only one court has critically examined, in the context of all of the statutory sentencing factors, whether the 1:167 ratio rests upon appropriate empirical foundations. *See Hossain*, 2016 WL 70583, at *5-7. In *Hossain*, the court thoroughly analyzed the sentencing factors and concluded that, "despite the potential dangers of synthetic cannabinoids, and the clear need for deterrence," *id.* at *5, the goals of sentencing are not achieved by imposing sentences "to upwards of thirty years in prison for dealing in a substance that was intended to mimic marijuana and so new that only a few years before . . . it was being sold in gas stations and convenience stores," *id.* at *7. Accordingly, the *Hossain* court deviated downward from the Guidelines-recommended range based in large part on "the newness of the regulation of XLR-11, . . . the infancy of our understanding of the effects of XLR-11 and other synthetic cannabinoids," *id.* at *6, and the fact that the ratio appears to lack a sound basis:

[4] To aid in this determination, a district court must consider certain factors, including: the nature and circumstances of the offense, the history and characteristics of the defendant, and the need for the sentence to provide just punishment, deterrence, incapacitation, and rehabilitation. 18 U.S.C. § 3553(a)(2).

> For starters, I am not convinced that THC is a particularly relevant substitute for XLR-11. Based off of the testimony I heard, I believe synthetic cannabinoids need their own category in the Drug Equivalency Chart in order to account for the differences between XLR-11 and THC. But, in the absence of an amendment to the Guidelines, I will use the THC Guideline range as a starting point.
>
> In considering the THC to marijuana ratio, I find it troubling that there does not seem to be any reason behind the 1:167 ratio. Although I asked each of the experts at the hearing, no one could provide me with a reason for this ratio, which has major implications in determining the base level offense. After my own research and a phone call to the Sentencing Commission, I still could find no basis for this ratio. It appears to have been included in the first set of Guidelines in 1987, with no published explanation. While a sentence must reflect the seriousness of the offense to provide just punishment, a sentence based on a range that seems to have <u>no cognizable basis</u> is not just.

Id. at *5-6 (emphasis added).

Most synthetic marijuana offenders have not, however, benefited from a similarly searching inquiry. Although some district courts have deviated downward from the Guidelines-recommended penalty range based in part on the "uncertainties surrounding the appropriate multiple for [synthetic marijuana] product[s] relative to marijuana," *see, e.g.*, Sentencing Tr. at 38:21, *United States v. Marg*, No. 3:11-cr-00130 (W.D. Wis. Dec. 26, 2012), ECF No. 68, most have imposed Guidelines-range sentences without question.

Courts of appeals have generally declined to address the ratio directly. In *United States v. Makkar*, for instance, the Tenth Circuit declined to rule on whether the ratio created irrational sentences, instead vacating and remanding on other grounds. 810 F.3d 1139, 1148 (10th Cir. 2015) ("We see no need . . . to resolve the defendants' additional objections."). Other appellate courts have declined to disturb the district courts' decisions to apply the 1:167 ratio because those decisions did not reflect clear error. *See, e.g.*, *Malone*, 809 F.3d at 258 (finding that the district court's decision to apply the ratio was not so clearly erroneous that it required reversal, "[e]ven though both [the government's and the defendant's] experts testified that the 1:167 ratio has no scientific basis"); *see also United States v. Carlson*, 810 F.3d 544, 556 (8th Cir. 2016) (finding no clear error in the district court's application of the 1:167 ratio despite extensive expert testimony that marijuana contained higher levels of THC than the ratio assumed), *petition for cert. filed*, 84 U.S.L.W. 3529 (U.S. Mar. 9, 2016) (No. 15-1136).

The result—potentially disproportionate sentences calculated with a formula that lacks appropriate scientific or evidentiary basis—does not fulfill the objectives of federal sentencing. Although district courts are not required to analyze whether a sentencing guideline is supported by empirical evidence, they <u>are</u> charged with imposing sentences that are "sufficient, but not greater than necessary" to achieve the goals of sentencing articulated in 18 U.S.C. § 3553(a). This obligation calls for

greater scrutiny of the unjustified effects of the 1:167 conversion ratio in sentencing synthetic marijuana offenders.

IV. APPLYING THE 1:167 RATIO RISKS SIGNIFICANT INEQUITIES.

Application of the 1:167 conversion ratio will likely produce inconsistent and inequitable results at sentencing by relying on downward deviations to correct an unsound calculation. Defendants sentenced under this ratio can receive vastly disparate sentences that depend, almost entirely, on a trial judge's willingness to deviate from the Guidelines-recommended penalty range. *See, e.g.*, Sentencing Tr. at 13:4-12, *United States v. Mansour*, No. 5:13-cr-00429 (N.D.N.Y. Jan. 11, 2016), ECF. No. 252 (imposing a one year, one day sentence despite application of the ratio resulting in a Guidelines range of 46 to 57 months); *Hossain*, 2016 WL 70583 at *5-6 (applying a 1:7 ratio, given that "there does not seem to be any reason behind the 1:167 ratio"); Sentencing Tr. at 21:14-25, *United States v. Tebbetts*, No. 5:12-CR-567 (N.D.N.Y. August 6, 2014), ECF No. 64 (applying the ratio without deviation, sentencing defendant to 87 months—the lowest end of the Guidelines-recommended range); *Carlson*, 810 F.3d at 556 (affirming the district court's within-Guidelines sentence of 210 months); *Malone*, 809 F.3d at 255-56 (*accord*, 117 months).

In this case, had the sentencing judge applied a 1:1 conversion ratio, defendant's base offense level would have been 23 rather than 33 (after applying

final adjustments), which would have resulted in a sentencing range of 57–71 months rather than 168–210 months. *See* Sentencing Tr. at 12:13-17, *United States v. Lababneh*, No. 1:14-cr-189 (N.D.N.Y. Dec. 14, 2015), ECF No. 45. Although the district judge ultimately deviated downward from the guidelines, in part due to the "high disparity" between the two ratios, *id.* at 12:23-25, defendant-appellant's 97-month sentence still far exceeds the maximum sentencing range if a 1:1 ratio were used.

The inequity of the 1:167 ratio may be further exacerbated because defendants confronting it may experience overwhelming pressure to plead guilty, especially when prosecutors are willing to stipulate to sentencing factors that would lower the sentencing range under the Guidelines. *See* Human Rights Watch, *An Offer You Can't Refuse: How US Federal Prosecutors Force Drug Defendants to Plead Guilty* 102 & Table 3 (Dec. 2013) (observing that prosecutors may negotiate terms that would lead to lower sentencing, while district courts imposed, on average, three times longer sentences when defendants go to trial), https://www.hrw.org/sites/default/files/reports/us1213_ForUpload_0_0_0.pdf.

* * *

In *Kimbrough v. United States*, the Supreme Court recognized the district courts' discretion to deviate from a Guidelines-recommended ratio based solely on policy considerations, including disagreements with the Guidelines. 552 U.S. at

101. Here, although the district court acknowledged that the 1:167 ratio creates a "somewhat high disparity in the guidelines scoring for this offense involving synthetic marijuana as opposed to regular marijuana," *see* Sentencing Tr. at 12:23-25, *Lababneh*, it is not clear from the record that the court understood its discretion to deviate from the ratio based solely on a policy disagreement with it. For the reasons set forth above, such a disagreement would be exceedingly well founded.

If this Court agrees, and determines that the relevant issues have been properly preserved, the *amicus* respectfully urges the Court to remand this matter to the district court. The district court, in turn, should permit the record to be supplemented, as appropriate, to inform whether that court should deviate from the 1:167 ratio on the basis of a policy disagreement.

By contrast, should this Court believe that a remand along those lines is not appropriate, *amicus* respectfully urges this Court to defer a precedential determination of the validity of the 1:167 ratio for synthetic marijuana offenses until a future case presents a more comprehensive record on this issue.

CONCLUSION

For the foregoing reasons, *amicus* respectfully urges this Court to remand to the district court for further factual development and reconsideration of the sentence imposed in this case.

Dated: New York, New York
March 31, 2016

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CERTIFICATE OF COMPLIANCE

Pursuant to Federal Rule of Appellate Procedure 32(a)(7)(C)(i), I certify that this brief complies with the type-volume limitations of Federal Rules of Appellate Procedure 29(d) and 32(a)(7)B) in that it contains 4,244 words in proportionally spaced 14-Point Times New Roman font, excluding the parts of the brief exempted by Federal Rule of Appellate Procedure 32(a)(7)(B)(iii).

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High Times

Low Sentences

Outline:

1. Synthetic drug breakdown
2. Four-Step approach to sentencing in synthetic drug cases
3. Applying the approach to specific substances

Synthetic Drugs in Federal Courts:

- Sentencing strategy applies to all synthetic drugs
- Primarily two categories of synthetic drugs:
  - Synthetic Cathinones
  - Synthetic Cannabinoids

Synthetic Cathinones

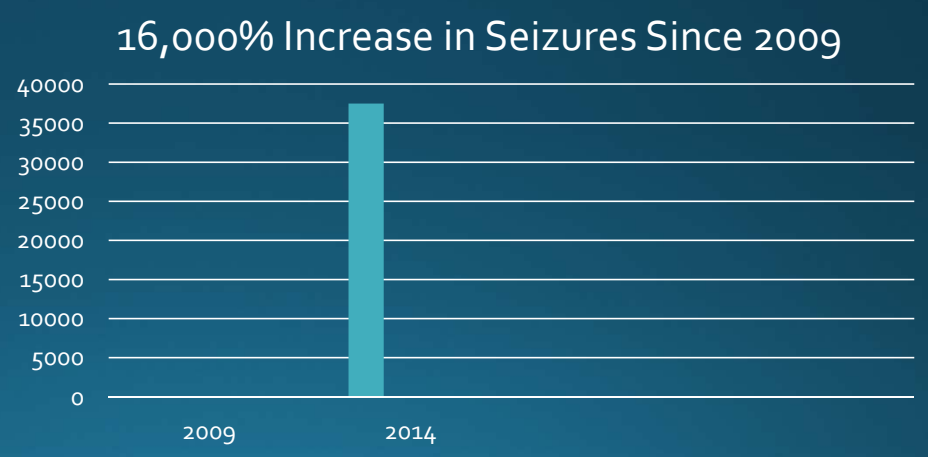
- Related to parent component Cathinone
- Psychoactive ingredient in Khat plant

Synthetic Cathinones

- Similar in effect to MDMA ("molly")
- Includes Methylone, Mephedrone, MDVP, Methcathinone, Methedrone
- Emerged in response to new classifications

Synthetic Cannabinoids

- Synthetic chemical designed to mimic the effects of marijuana/THC
- Chemical sprayed on organic substance and is then smoked
- Law enforcement priority:



Substances are Readily Available

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SYNTHETIC CANNABINOIDS

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- AB-CHMINACA
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- MAM-2201
- THJ-2201
- AM-2201
- NM-2201
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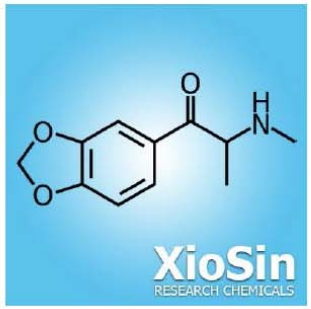

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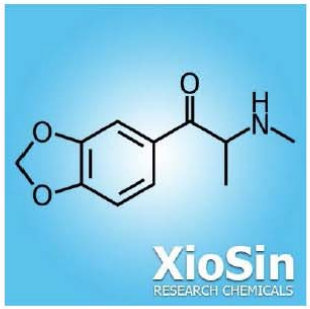
$750.00



Methylone 10g

$180.00

Four Steps to a Lower Sentence:

1. Look to 2D1.1's tables to see if your drug is listed;
2. If not, explain why the listed related substance with the lowest MJ ratio is the "most closely related;"
3. Raise *Kimbrough* challenge to the most "closely related" drug's MJ ratio;
4. Argue that your drug is less potent/dangerous than whatever drug is found to be the most "closely related."

Photo by Herbie Greene, Warlocks Under the Stairs, 11/01/65

Step One: Consult the Guideline

- Is your drug referenced in § 2D1.1(c)(drug quantity table) or Application Note 8(D)(drug equivalency tables)?
  - If so, move to step three;
  - If not, move to step two

(c) DRUG QUANTITY TABLE

	Controlled Substances and Quantity*	Base Offense Level
(1)	• 90 KG or more of Heroin; • 450 KG or more of Cocaine; • 25.2 KG or more of Cocaine Base; • 90 KG or more of PCP, or 9 KG or more of PCP (actual); • 45 KG or more of Methamphetamine, or 4.5 KG or more of Methamphetamine (actual), or 4.5 KG or more of "Ice"; • 45 KG or more of Amphetamine, or 4.5 KG or more of Amphetamine (actual); • 900 G or more of LSD; • 36 KG or more of Fentanyl; • 9 KG or more of a Fentanyl Analogue; • 90,000 KG or more of Marihuana; • 18,000 KG or more of Hashish; • 1,800 KG or more of Hashish Oil; • 90,000,000 units or more of Ketamine; • 90,000,000 units or more of Schedule I or II Depressants; • 5,625,000 units or more of Flunitrazepam.	Level 38

Step Two:

- In the case of a drug not specifically referenced, determine the base offense level using the marijuana equivalency of **<u>the most closely related</u>** referenced controlled substance. U.S.S.G. § 2D1.1 n. 6.

"Most Closely Related Controlled Substance:"

A. Whether the drug has a **chemical structure** that is "substantially similar" to a controlled substance referenced by the guideline;

B. Whether the drug has an **effect** that is "substantially similar" to the effect of a controlled substance referenced in the guideline;

C. Whether the drug is **more or less potent** than the drug referenced in the guideline.

What does "Substantially Similar" Mean?

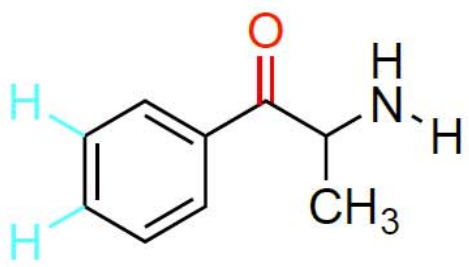
- Not an accepted term within fields of forensic chemistry or toxicology
- Entirely subjective, expert-dependent standard
- The outlaws win!

"Most Closely Related" = Subjective Standard

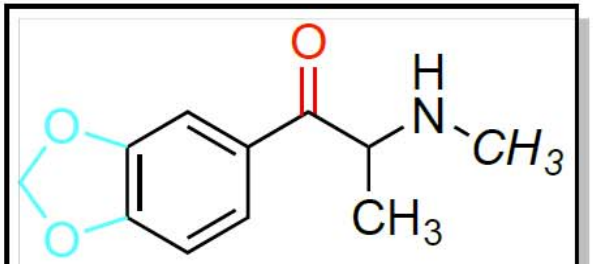
U.S. v. Coley, 2013 WL 5883589 (D. Md. 2013)	***U.S. v. Bennett*, 659 F.3d 711, 715 (8th Cir. 2011)**	***U.S. v. Major*, 801 F. Supp. 2d 511 (E.D. Va. 2011)**
BZP	BZP	BZP
Δ presented expert testimony re three factors	Δ Objected to substance of comparison	Court looked to DEA's website
Phenmatrazine most closely related drug	MDMA most closely related drug	Amphetamine most closely related
1:80 MJ ratio	1:500 MJ ratio	1:2,000 MJ ratio

Substantially Similar Chemical Structure:

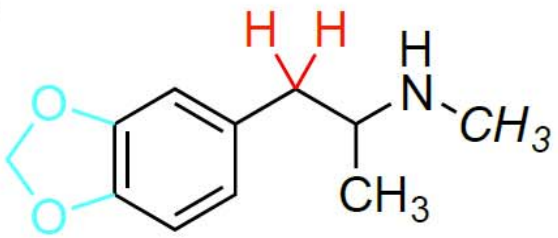
1. Select the related substance with the most favorable marijuana ratio;
2. Make a chemistry-based argument justifying why this is the **most closely related** chemical structure.



cathinone



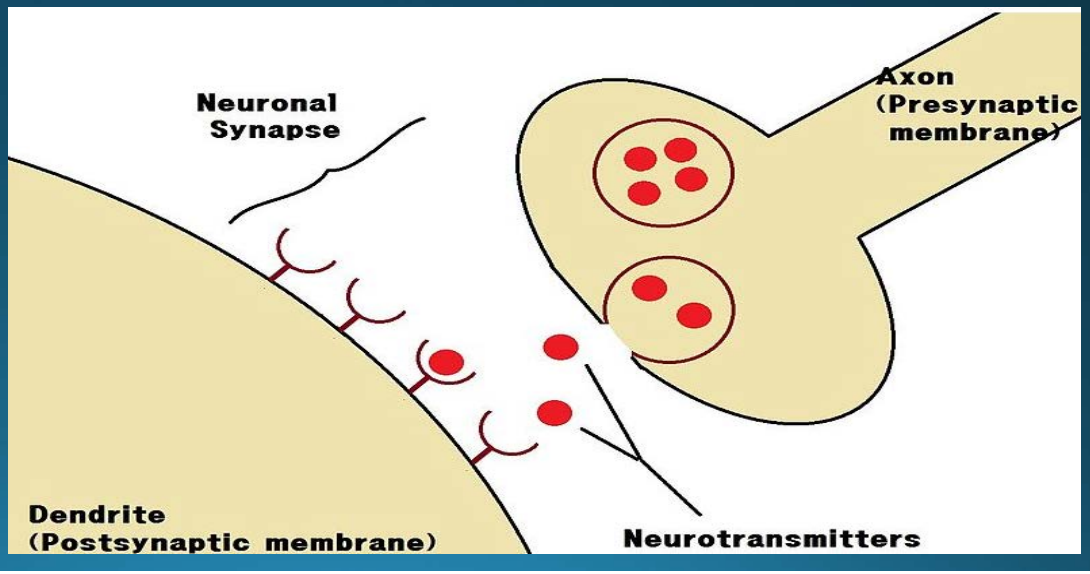
methylone
(a cathinone derivative)



MDMA
(amphetamine derivative)

Substantially Similar in Effect:

1. Look to toxicology studies comparing neurotransmitter activity (DAT, NET, SERT, etc.) between charged substance and drugs of comparison;
2. Explain why activity of desired substance is most similar.



By: EDK006, Depicture of Neuronal Synapse 26, Nov. 2011

Relative Potencies:

- Toxicology/pharmacology related inquiry
- Hierarchy of studies
  1. *In vivo (using whole animal)*
     1. *human*
     2. *animal*
  2. *In vitro (using isolated cells or tissue)*
  3. *In silico (using computer models)*

Relative Potencies:

- Look to toxicology studies regarding neurotransmitter activity/animal responses

	Dose	n*	%MDMA-Appropriate Responding (±SEM)†	Responses/Minute (±SEM)
		B. MDMA-Trained Animals		
MDC	1.5	6/7	36% (20)	6.3 (1.8)
	2.0	7/8	77% (12)	6.6 (2.8)
	2.25	4/7	93% (7)	4.9 (0.3)
		ED_{50} = 1.64 (95%CL 1.37–1.97) mg/kg		
MDMC	1.5	4/8	33% (24)	6.1 (0.9)
	1.75	5/7	70% (16)	4.6 (1.0)
	2.0	5/7	98% (2)	6.2 (1.5)
		ED_{50} = 1.60 (95%CL 1.43–1.79) mg/kg		
MDMA	1.5	8/8	97% (1)	9.1 (2.3)
Saline (0.9%)	1.0 ml/kg	8/8	2% (1)	13.2 (4.8)

- Dal Cason, Terry et al., *Cathinone: An Investigation of Several N-Alkyl and Methylenedioxy-Substituted Analogues*, Pharmacology, Biochemistry and Behavior Vol 58 No. 4 1997

Step Three:

- Apply *Kimbrough* Challenge to the most closely related substance's marijuana equivalency ratio
- Typically MDMA and THC
- Ratios for these substances are not based on empirical data

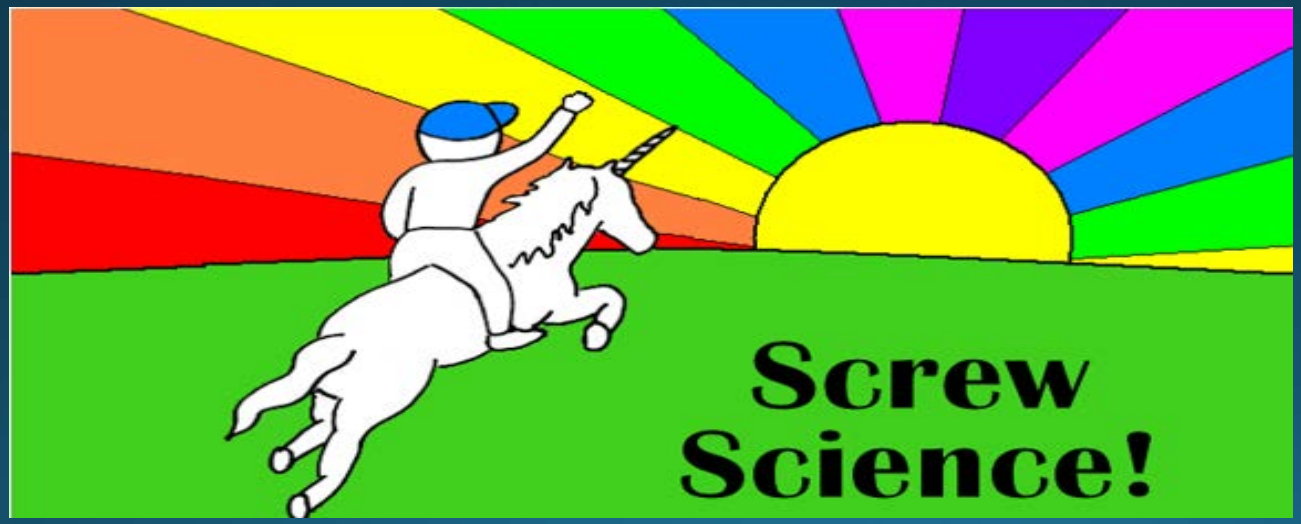
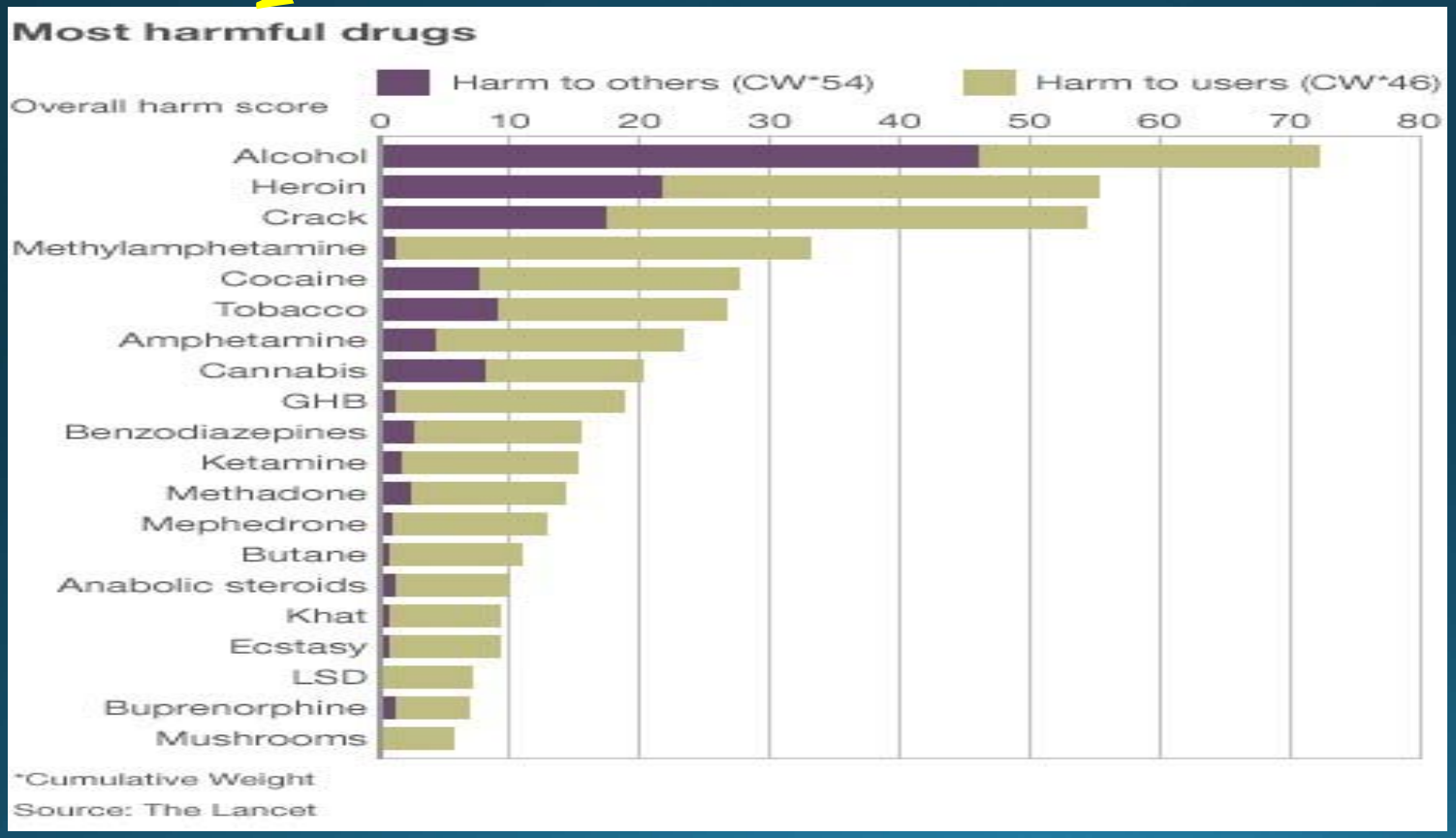


Illustration obtained from: www.themarysue.com

STEP FOUR:

- Argue for a variance based on your drug being less harmful/potent than referenced drug of comparison. *See* 2D1.1 c.n. 6
- Refer to:
  - Poison Control, ER, and DEA statistics;
  - Pharmacology/toxicology reports re potency;
  - Literature re comparative drug harms;
  - Patterns in chemistry;
  - *Brady* materials.

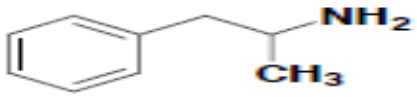
Nutt's Scale of Comparative Harms:



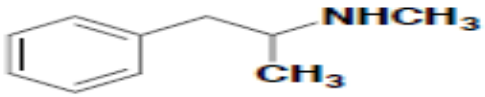
Nutt, David, *Drug Harms in the UK: a Multicriteria Decision Analysis* , The Lanclet Vol. 376 No. 9752 p. 1558 2010

Chemistry Patterns Within the Guidelines:

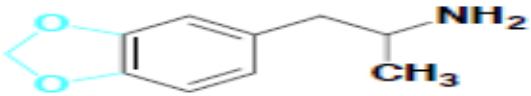
1. Introduction of ketone to substance reduces its MJ equivalent by over 98%
   - (Methamphetamine = 20 kg > Methcathinone = 380 g)
2. Introduction of methylenedioxy to substance reduces its MJ equivalent by over 97%
   - (Amphetamine = 20 kg > MDMA = 500 g)



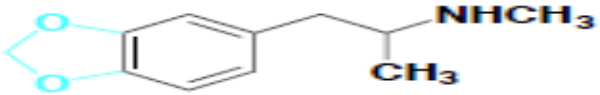
amphetamine



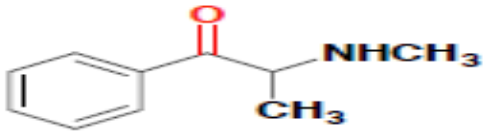
methamphetamine ("meth")



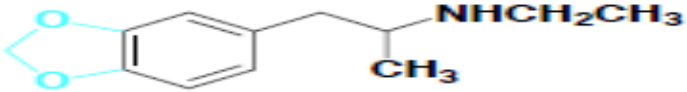
methylenedioxy-amphetamine (MDA)



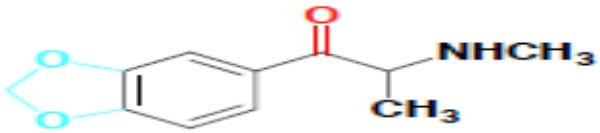
methylenedioxy-methamphetamine (MDMA)



methcathinone



methylenedioxy-ethamphetamine (MDEA)



methylone

Methylone Application

- **Step One**: Methylone is not listed in 2D1.1

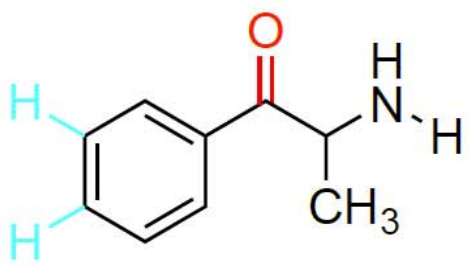
Methylone Application

- **Step Two**: Determine the most closely related listed drug

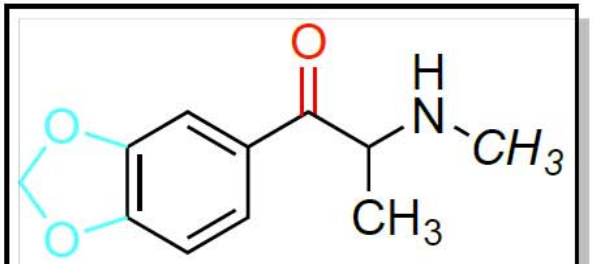
1 gm of Khat =	.01 gm of marihuana
1 gm of 3,4-Methylenedioxymethamphetamine/MDMA =	500 gm of marihuana

Methylone Application

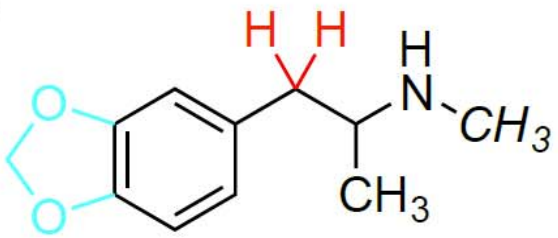
- Substantially similar chemical structure



cathinone



methylone
(a cathinone derivative)



MDMA
(amphetamine derivative)

Methylone Application

- Substantially similar effect:
  - Methylone, Cathonone, and MDMA are all stimulants of the CNS;
  - Not sufficient comparative data re specific neurotransmitter activity of three drugs.

Methylone Application

- Relative potencies of MDMA, Methlyone and Cathinone:
  - Eight of 10 studies have found MDMA to be more potent than Methylone;
  - Government concession regarding potencies.

	Dose	n*	%MDMA-Appropriate Responding (±SEM)†	Responses/Minute (±SEM)
		B. MDMA-Trained Animals		
MDC	1.5	6/7	36% (20)	6.3 (1.8)
	2.0	7/8	77% (12)	6.6 (2.8)
	2.25	4/7	93% (7)	4.9 (0.3)
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Dal Cason, Terry et al., *Cathinone: An Investigation of Several N-Alkyl and Methylenedioxy-Substituted Analogues*, Pharmacology, Biochemistry and Behavior Vol 58 No. 4 1997

Methylone Application

- **Step Three**: MDMA's MJ ratio of 1:500 is based on debunked studies and outdated science
  - *United States v. McCarthy*, No. 09-cr-1136, 2011 WL 1991146 (S.D.N.Y. May 19, 2011) (1:200 MJ ratio)
  - Compare to cocaine's 1:200 ratio (Halpern testimony)

Methylone Application

- **Step Four**: Methylone is substantially less potent/harmful than MDMA
  - MDMA is more used and abused than Methylone
  - The addition of the ketone should result in a 98% reduction of MDMA's MJ ratio
  - MDMA is five-fold more potent than Methylone

Methylone Application

- Final result:
- Government's requested MJ ratio of **1:500**
- Four-step MJ ratio of **1:10**
- Difference between BOL **12** and **30**

SENTENCING TABLE
(in months of imprisonment)

	Offense Level	I (0 or 1)	II (2 or 3)	III (4, 5, 6)	IV (7, 8, 9)	V (10, 11, 12)	VI (13 or more)
		Criminal History Category (Criminal History Points)					
	1	0-6	0-6	0-6	0-6	0-6	0-6
	2	0-6	0-6	0-6	0-6	0-6	1-7
	3	0-6	0-6	0-6	0-6	2-8	3-9
	4	0-6	0-6	0-6	2-8	4-10	6-12
Zone A	5	0-6	0-6	1-7	4-10	6-12	9-15
	6	0-6	1-7	2-8	6-12	9-15	12-18
	7	0-6	2-8	4-10	8-14	12-18	15-21
	8	0-6	4-10	6-12	10-16	15-21	18-24
	9	4-10	6-12	8-14	12-18	18-24	21-27
Zone B	10	6-12	8-14	10-16	15-21	21-27	24-30
	11	8-14	10-16	12-18	18-24	24-30	27-33
Zone C	12	10-16	12-18	15-21	21-27	27-33	30-37
	13	12-18	15-21	18-24	24-30	30-37	33-41
	14	15-21	18-24	21-27	27-33	33-41	37-46
	15	18-24	21-27	24-30	30-37	37-46	41-51
	16	21-27	24-30	27-33	33-41	41-51	46-57
	17	24-30	27-33	30-37	37-46	46-57	51-63
	18	27-33	30-37	33-41	41-51	51-63	57-71
	19	30-37	33-41	37-46	46-57	57-71	63-78
	20	33-41	37-46	41-51	51-63	63-78	70-87
	21	37-46	41-51	46-57	57-71	70-87	77-96
	22	41-51	46-57	51-63	63-78	77-96	84-105
	23	46-57	51-63	57-71	70-87	84-105	92-115
	24	51-63	57-71	63-78	77-96	92-115	100-125
	25	57-71	63-78	70-87	84-105	100-125	110-137
	26	63-78	70-87	78-97	92-115	110-137	120-150
Zone D	27	70-87	78-97	87-108	100-125	120-150	130-162
	28	78-97	87-108	97-121	110-137	130-162	140-175
	29	87-108	97-121	108-135	121-151	140-175	151-188
	30	97-121	108-135	121-151	135-168	151-188	168-210
	31	108-135	121-151	135-168	151-188	168-210	188-235
	32	121-151	135-168	151-188	168-210	188-235	210-262
	33	135-168	151-188	168-210	188-235	210-262	235-293
	34	151-188	168-210	188-235	210-262	235-293	262-327
	35	168-210	188-235	210-262	235-293	262-327	292-365
	36	188-235	210-262	235-293	262-327	292-365	324-405
	37	210-262	235-293	262-327	292-365	324-405	360-life
	38	235-293	262-327	292-365	324-405	360-life	360-life
	39	262-327	292-365	324-405	360-life	360-life	360-life
	40	292-365	324-405	360-life	360-life	360-life	360-life
	41	324-405	360-life	360-life	360-life	360-life	360-life
	42	360-life	360-life	360-life	360-life	360-life	360-life
	43	life	life	life	life	life	life

November 1, 2012

XLR-11 Application

- **Step one**: substance is not covered in section 2D1.1

XLR-11 Application

- **Step Two**: Determine the "most closely related" listed drug

Schedule I Marihuana	
1 gm of Marihuana/Cannabis, granulated, powdered, etc. =	1 gm of marihuana
1 gm of Hashish Oil =	50 gm of marihuana
1 gm of Cannabis Resin or Hashish =	5 gm of marihuana
1 gm of Tetrahydrocannabinol, Organic =	167 gm of marihuana
1 gm of Tetrahydrocannabinol, Synthetic =	167 gm of marihuana

XLR-11 application

- Substantially similar chemical structure:
- Government has conceded that XLR-11 is not similar to either MJ or THC. *See United States v. Hossain*, 15-CR-14034 (S.D. Fl. 2016)

XLR-11 application

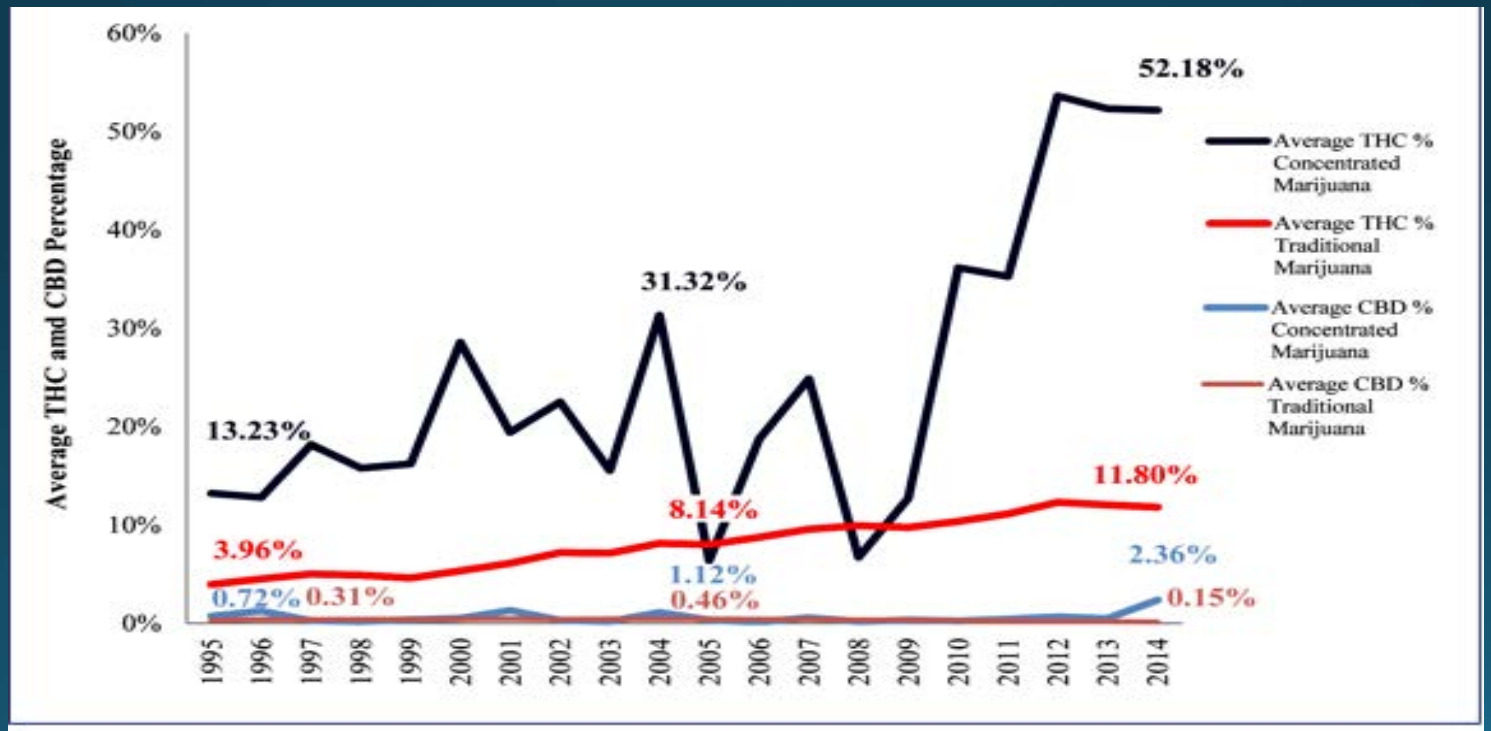
- Substantially similar effect:
  - THC is the psychoactive ingredient in MJ
    - THC=MJ=XLR-11
  - XLR-11 binds most strongly to the CB2 receptor, associated with pain. *See* Dr. Dudley Decl.

XLR-11 Application

- Relative potencies:
  - No human *in vivo* studies regarding relative potencies of substances

XLR-11 Application

- **Step Three**: challenge THC's 1:167 ratio



Source: University of Mississippi, Potency Monitoring Program, Quarterly Report 127

XLR-11 Application

- Challenge the 167:1 ratio:

In considering the THC to marijuana ratio, I find it troubling that there does not seem to be any reason behind the 1:167 ratio. Although I asked each of the experts at the hearing, no one could provide me with a reason for this ratio, which has major implications in determining the base level offense. After my own research and a phone call to the Sentencing Commission, I still could find no basis for this ratio. It appears to have been included in the first set of Guidelines in 1987, with no published explanation.

Hossain, 15-CR-14034 (S.D. Fl. 2016)

U.S. v. Carlson, 810 F.3d 544 (8th Cir. 2016)

XLR-11 Application

- Argue for 1:7 ratio

unrealistic in terms of psychoactive marijuana. We know from Government studies that the average THC content in marijuana today is over 14 percent. So the ratio should be one to seven, not one to 167.

(DE 229, Tr. at 116-17).

Hossain, 15-CR-14034 (S.D. Fl. 2016)

XLR-11 Application

- Challenge 1:167 ratio:
  - Government's concessions in *Carlson*
  - Court's findings in *Hossain*
  - Second Circuit's statements in *U.S. v. Lababneh*, __ Fed. App.__, 2016 WL 1612979 (2d Cir. 2016)
  - *United States v. Marg*, No. 3:11-cr-00130 (W.D. Wis. Dec. 26, 2012), ECF No. 69 (varying downward from 1:167 ratio)

XLR-11 Application

- **Step Four**: substance is arguably less potent/harmful than THC:
  - One kilogram of XLR-11 is sprayed onto 10 kilograms of organic material
  - This suggests a 1:10 ratio
  - Long-term studies re harms of Marijuana/THC

XLR-11 Application

- Final Result:
- Gov. requested 1:167
- Four-step ratio of between 1:1 and 1:10
- Difference in BOL from 12 to 24.