IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF KANSAS

UNITED STATES OF AMERICA, **Plaintiff,** **v.** **TERRIE ADAMS (06) and** **CRAIG BROOMBAUGH (10),** **Defendants.**	**Case No. 14-40005-DDC**

MEMORANDUM AND ORDER

This matter comes before the court on defendant Michelle Reulet's Motion to Exclude or Limit the Government Expert Testimony and Evidence (Doc. 905). The government responded (Doc. 909). Ms. Reulet has since pleaded guilty and is no longer pursuing this issue. But her two co-defendants, Terrie Adams and Craig Broombaugh, have joined her motion (Doc. 930) and those two defendants have standing to pursue Ms. Reulet's Motion. For reasons explained below, the court denies defendants' Motion.

I. Background

Defendants' Motion asks the court to exclude or limit testimony of two of the government's expert witness: Dr. Daniel Willenbring and Dr. Jordan Trecki. The court already has overruled a challenge to Dr. Willenbring's testimony in its earlier Rule 702 Order addressing the government's experts. Doc. 546 at 22–23. And the court did not find anything new in defendants' current motion to warrant "a second swing at excluding this witness's opinions." Doc. 941 at 3. But, for Dr. Trecki, the court determined that defendants' Motion previewed issues implicating the court's gatekeeping obligations. Specifically, "Chief Judge Armijo's order

in *United States v. Stockton*[1] raise[d] meaningful concerns about several aspects of Dr. Trecki's opinions." *Id.* at 2. And, the *Stockton* Order was not available when the court issued its earlier Rule 702 Order. So, consistent with its Rule 702 obligations, the court directed the government to have Dr. Trecki appear for a pretrial evidentiary hearing where: (a) he could address whether any of the concerns raised in the *Stockton* order apply here; and (b) submit to adverse questioning by defense counsel. The court limited defendants' questioning strictly to Rule 702's foundational requirements. The court conducted this hearing on February 3, 2017.

At the hearing, Dr. Trecki testified about the methodology he had used to render opinions as a pharmacologist for the DEA. At trial, the government will rely on Dr. Trecki's testimony, in part, to prove that the substances listed in the Indictment are controlled substance analogues ("CSA"). A CSA is a substance:

> (i) the chemical structure of which is substantially similar to the chemical structure of a controlled substance in schedule I or II;
>
> (ii) which has a stimulant, depressant, or hallucinogenic effect on the central nervous system that is substantially similar to or greater than the stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance in schedule I or II; or
>
> (iii) with respect to a particular person, which such person represents or intends to have a stimulant, depressant, or hallucinogenic effect on the central nervous system that is substantially similar to or greater than the stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance in schedule I or II.

21 U.S.C. § 802(32)(A). Specifically, Dr. Trecki will testify about prong ii, the "effects" provision. This prong turns on any stimulant, depressant, or hallucinogenic effect of a substance on the central nervous system and whether any such effect is substantially similar to or greater than the stimulant, depressant, or hallucinogenic effect of a controlled substance. Dr. Trecki's

[1] 13-0571-MCA, Order at 2-10 (D.N.M. May 2, 2010) (filed as Doc. 905-1 in this case).

testimony at the hearing focused on the methodology he used to form his opinions about the substances identified in the Indictment in this case.

Dr. Trecki testified that when the DEA identifies a new substance needing to be tested, his first step is collecting research and literature about the substance. Dr. Trecki searches many sources, including the internet, existing patents about the substance, published and unpublished articles about the substance, and resources for the substance available at the National Institute on Drug Abuse.

Next, Dr. Trecki studies the Structure-Activity-Relationship (SAR) of the substance. This test studies the substance's molecular structure. Dr. Trecki testified that the SAR is a predictive test. In other words, after studying the SAR tests of the substance and comparing it to the SAR of a scheduled substance, he can opine what effect—stimulant, depressant, or hallucinogenic—the substance likely will have. Dr. Trecki testified that the SAR studies have been found reliable and that they are widely accepted in the pharmacological community as a means to predict a substance's effect.

The next step of Dr. Trecki's methodology uses *in vitro* binding tests and *in vitro* functional tests on the substance. The phrase "*in vitro*," Latin for "in glass," means that these tests are conducted in a petri dish. The *in vitro* binding tests determine the affinity or attraction of the substance to bind to particular brain receptors. The *in vitro* functional tests determine, on a molecular level, whether the substance will affect the brain or block an effect on the brain. In scientific terms, this test determines whether the substance acts as an agonist or an antagonist. After *in vitro* testing, Dr. Tecki testified that he can opine what effect— stimulant, depressant, or hallucinogenic—the substance likely will have. Dr. Trecki testified that this type of testing is widely accepted in the pharmacological community for predicting a substance's effect.

The next step of Dr. Trecki's methodology uses *in vivo*, or "in life" testing. Dr. Trecki testified that these tests are conducted on rodents. He testified that he studies two different kinds of tests—"*in vivo* locomotor" tests and "*in vivo* drug discrimination" tests. Locomotor tests use infrared beams to measure whether a substance has had a stimulant or depressant effect on the rodents. Drug discrimination tests involve giving rodents the substance and determining if rodents can differentiate between it and a controlled substance. Dr. Trecki testified that *in vivo* testing permits him to opine about the effect a substance will have. Dr. Trecki testified that this testing has been found reliable and is widely accepted in the pharmacological community for determining a substance's effect.

Finally, Dr. Trecki's uses case reports to compare the effect of substances to controlled substances. Dr. Trecki testified that this testing has been found reliable and is widely accepted in the pharmacological community for determining a substance's effect.

Dr. Trecki also testified about perceived limitations of his methodologies as applied to the substances listed in the Indictment. First, Dr. Trecki explained that he does not have results from all of the tests for all of the substances listed in the Indictment. This is so because he has not tested certain substances with each test. Specifically, Dr. Trecki did not test *in vivo* locomotor, *in vivo* drug discrimination, or review case studies for some of the substances listed in the Indictment. He explained that for each substance, he begins by gathering literature on the substance, studying the SAR of the substance, and then conducts *in vitro* testing on the substance. But, if the substance stops circulating before he completes his testing, the substance is no longer a priority for further testing. Dr. Trecki testified that he is currently tracking more than 300 different synthetic cannabinoids, 200 different stimulants, and between 30 and 50

opioid-like drugs. So, he prioritizes testing based on substances that are appearing "on the market."

Second, Dr. Trecki explained why his methodology does not include human testing. Dr. Trecki testified that using humans to test substances to determine whether they qualify as CSAs would be unethical. Dr. Trecki analogized these substances to lead or cyanide; according to Dr. Trecki, it is not necessary to test lead or cyanide to determine if they would have harmful effects on humans, and government authorization of such testing would be unethical. Similarly, the government does not authorize human testing of alleged CSAs. Instead, pharmacologists test rodents. The results of these tests allow pharmacologists to opine whether a substance has a substantially similar stimulant, depressant, or hallucinogenic effect on the central nervous system to a controlled substance.

Dr. Trecki also explained why he does not consider potency of the substance when determining whether the stimulant, depressant, or hallucinogenic effect of the substance is substantially similar to the effect of a controlled substance. He testified that he understands that potency is not relevant to the standard adopted in § 802(32)(A)(ii) *i.e.*, whether the substance has a substantially similar stimulant, depressant, or hallucinogenic effect to a controlled substance.[2]

Finally, Dr. Trecki explained that even though Judge Armijo limited his testimony in the *Stockton* case based on his methodologies, he has testified in other cases since *Stockton* and no judge has limited his testimony in the same fashion a Judge Armijo. Dr. Trecki testified that he has used the same methodologies in each case, and that he used the same methodologies to form his opinions here.

[2] Dr. Trecki also testified about his understanding of potency's relevance to § 802(32)(A)(iii) (whether with respect to a particular person, which such person represents or intends it to have a stimulant, depressant, or hallucinogenic effect on the central nervous system that is substantially similar to or greater than the stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance).

II. Legal Standard

The Court has a "gatekeeping obligation" to determine the admissibility of expert testimony. *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 147 (1999) (citing *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 589 (1993)). The Court must discharge this responsibility for all expert testimony, not just scientific experts. *See United States v. Garza*, 566 F.3d 1194, 1199 (10th Cir. 2009). The Court has broad discretion when deciding whether to admit or exclude expert testimony. *Kieffer v. Weston Land, Inc.*, 90 F.3d 1496, 1498 (10th Cir. 1996) (quoting *Orth v. Emerson Elec. Co.*, 980 F.2d 632, 637 (10th Cir. 1992)). The admissibility of expert testimony is governed by Federal Rule of Evidence 702. It provides:

> A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:
>
> (a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
>
> (b) the testimony is based on sufficient facts or data;
>
> (c) the testimony is the product of reliable principles and methods; and
>
> (d) the expert has reliably applied the principles and methods to the facts of the case.

Fed. R. Evid. 702.

The Court must apply a two-part test to determine admissibility under this rule. *Conroy v. Vilsack*, 707 F.3d 1163, 1168 (10th Cir. 2013). First, it must decide "whether the expert is qualified 'by knowledge, skill, experience, training, or education' to render an opinion." *Id.* (quoting *United States v. Nacchio*, 555 F.3d 1234, 1241 (10th Cir. 2009) (quoting Fed. R. Evid. 702)). Second, the Court "'must satisfy itself that the proposed expert testimony is both reliable and relevant, in that it will assist the trier of fact, before permitting a jury to assess such

testimony.'" *Id.* (quoting *United States v. Rodriguez–Felix*, 450 F.3d 1117, 1122 (10th Cir. 2006) (further citations omitted)).

At the February 3, 2017 hearing, defendants stipulated that Dr. Trecki is qualified to testify as an expert under Rule 702. The government's evidence thus focused on the second part of the test—whether Dr. Trecki's testimony is reliable, relevant, and helpful to the jury. To determine whether the expert's testimony is reliable, the court must assess "whether the reasoning or methodology underlying the testimony is scientifically valid and . . . whether that reasoning or methodology properly can be applied to the facts in issue." *Daubert*, 509 U.S. at 592–93.

Daubert also identified a non-exhaustive list of factors that trial courts should consider when deciding whether proffered expert testimony is reliable under Fed. R. Evid. 702. These factors include: (1) whether the theory used can be and has been tested; (2) whether it has been subjected to peer review and publication; (3) the known or potential rate of error; and (4) the theory's general acceptance in the scientific community. *Id.* at 593–94. The Supreme Court has emphasized, however, that these four factors are not a "definitive checklist or test" and a court's gatekeeping inquiry into reliability must be "tied to the facts of a particular case." *Kumho Tire*, 526 U.S. at 150. The Rule 702 analysis thus "is a flexible one" and its focus "must be solely on principles and methodology, not the conclusions that they generate." *Daubert*, 509 U.S. at 594–95.

III. Analysis

In *Stockton*, the New Mexico federal court raised concerns about aspects of Dr. Trecki's expert testimony in a case also involving CSAs. In determining whether Dr. Trecki's opinions

are reliable and relevant as applied to this case, the court considers, in part, each issue *Stockton* raised.

A. *United States v. Stockton*

At the outset, the *Stockton* court concluded that Dr. Trecki was qualified by "knowledge, skill, experience, training and education, . . . to testify about pharmacological principles and methods as they relate to synthetic cannabinoids" as a Rule 702 expert witness. Doc. 905-1 at 2. But the court determined that some of Dr. Trecki's opinion testimony did not meet Rule 702's standards. The court concluded that Dr. Trecki: (1) used an improper definition of "substantially similar" in his methodologies; (2) rendered improper conclusions based on insufficient testing about a substance called AM-694; and, (3) unreliably applied his principles and methods. *See* Doc. 905-1. AM-695 is not one of the substances put in issue by the Indictment in this case. So, the court turns to the other two issues that *Stockton* raises.

1. Definition of Substantially Similar

One of the other issues *Stockton* raised was Dr. Trecki's definition of "substantially similar." At the February 3, 2017 hearing, Dr. Trecki testified that "substantially similar" is not a scientific term, and there is no consensus in the scientific community about what it means. So, Dr. Trecki explained, he uses the plain English definition found in the dictionary. In *Stockton*, the court found that Dr. Trecki improperly conflated the dictionary definitions of "substantially" and "similar" to craft his own definition. Doc. 905-1 at 3. Although the court did not have a problem with Dr. Trecki's resort to the dictionary, it took issue with the fact that Dr. Trecki omitted part of the dictionary's definition for "substantially"—"largely but not wholly specified." *Id.* By defining "substantially similar" as "relating to a substance with common characteristics" instead of "having characteristics largely, but not wholly, in common," the court

found that Dr. Trecki improperly reduced the government's burden. *Id.* So, the court concluded that Dr. Trecki's testimony would not be helpful to the jury. *Id.*

At the February 3, 2017 hearing, Dr. Trecki testified that he always has used the same definition of "substantially similar" in his testing, and that he uses Merriam-Webster's definition of both "substantial" and "similar." He defines "substantial" as "consisting of or relating to" and "being largely but not wholly that which is specified." Merriam-Webster's Online Dictionary, http://www.merriam-webster.com/dictionary/substantial (last visited February 8, 2017). He defines "similar" as "having characteristics in common." Merriam-Webster's Online Dictionary, http://www.merriam-webster.com/dictionary/similar (last visited February 8, 2017). He testified that in *Stockton*, he tried to combine the definitions of substantial and similar to define "substantially similar" for the court. And, he testified that he may have omitted part of the definition in his *Stockton* testimony. But, at the hearing on Feburary 3, 2017, he testified that he only has used one definition for "substantially similar" in his methodology. He testified that the definition he uses is: consisting of or relating to a substance that which is largely but not wholly specified and having characteristics in common. Based on this testimony, the court concludes that this aspect of the issue in *Stockton* is not in play here.

2. Reliability of Dr. Trecki's Application

The other *Stockton* issue concerns the way Dr. Trecki applied his methodologies and principles. The *Stockton* court found that SAR studies, *in vitro* binding test and functional test studies, and *in vivo* test studies are recognized methods for investigating the pharmacological properties of synthetic cannabinoids. But, the court found these methods have not been scientifically validated as a reliable method for determining the hallucinogenic effect of synthetic cannabinoids on the *human* central nervous system. The court questioned whether Dr. Trecki

used data from his methods in a scientifically responsible manner because they have not been shown to determine the effect of synthetic cannabinoids on the human central nervous system. Doc. 905-1 at 7–9. *Stockton* noted that the only scientists who have accepted Dr. Trecki's methodologies are his colleagues at the DEA. *Stockton* also found that the "unquailed opinions set out by Dr. Trecki in his . . . [s]ummaries . . . imply a level of confidence that exceeds the current state of scientific knowledge." Thus *Stockton* found that Dr. Trecki's summaries did not pass the Rule 702(d) standard that "the expert [must have] reliably applied the principles and methods to the facts of the case." The court limited Dr. Trecki's testimony about comparing effects of alleged CSAs and to controlled substances and concluding that the hallucinogenic effects of the alleged CSAs on a human's central nervous systems are substantially similar or greater than those of the controlled substance.

At the February 3, 2017 hearing, Dr. Trecki explained why the government does not order human testing on alleged CSAs. His explanation was simple: It would be unethical to test the effects of these substances on humans. He testified that there is a difference between testing to determine whether a substance is safe and effective for human or therapeutic purposes and testing to determine whether a substance qualifies as a CSA. For the former, there would need to be human testing because the substances are intended for human consumption. For the latter, ordering human testing would raise substantial ethical concerns because the substances are not so intended. Dr. Trecki explained that the *in vivo* testing of alleged CSAs is conducted on rodents because rodents are mammals. Studying the effect of alleged CSAs on a mammalian central nervous system allows him to predict the effect the substance would have on a human central nervous system without actually testing humans.

B. Rule 702

Based on the testimony presented at the hearing on February 3, 2107, the court concludes that Dr. Trecki's testimony meets the threshold standard established by Rule 702. During his testimony, Dr. Trecki explained the methodology he uses in testing alleged CSAs and how each step has been widely accepted by the pharmacological community. Further, Dr. Trecki explained the *Stockton* issues sufficiently. Thus the court, performing its gatekeeper role, finds that Dr. Trecki's testimony is based on sufficient facts and data, the product of reliable principles and methods, and that Dr. Trecki has applied the principles and methods to the facts of the case reliably. The court further concludes that Dr. Trecki's testimony will help to the jury to determine a fact in issue.

Counsel for both defendants cross-examined Dr. Trecki about several topics at the hearing on February 3, 2017. These topics included Dr. Trecki's definition of "substantially similar," testimony he has given at other trials, Dr. Trecki's failure to consider the potency of the alleged analogues in forming his opinions, the lack of human testing on the substances listed in the Indictment in this case, and studies Dr. Trecki relies on for his opinion that were not a part of his Rule 16 disclosures. But none of Dr. Trecki's testimony on these subjects persuaded the court that the reasoning or methodology underlying his putative testimony" was not "scientifically valid" or could not be properly applied to the "facts in issue." *See Daubert*, 509 U.S. at 592–93. Further, neither defendant has adduced any evidence that Dr. Trecki's methodology fails any of the factors outline in *Daubert*. *See id.* at 593–94 (outlining several factors the district court considers including whether the theory used can be and has been tested, whether it has been subjected to peer review and publication, the known or potential rate of error, and the theory's general acceptance in the scientific community). Instead, counsel raised issues

which might affect a jury's evaluation of Dr. Trecki's testimony and whether the jury should accredit his conclusions. But the court's Rule 702 analysis is "a flexible one" and its focus "must be solely on principles and methodology, not the conclusions that they generate." *Daubert*, 509 U.S. at 594–95. The court finds that Dr. Trecki's testimony is based on sufficient facts and data, the product of reliable principles and methods, and that he has applied the principles and methods to the facts of the case reliably to testify under Rule 702. The defendants' motion is thus denied.

IT IS THEREFORE ORDERED BY THE COURT THAT defendants' Motion to Exclude or Limit the Government Expert Testimony and Evidence (Doc. 905) is denied.

IT IS SO ORDERED.

Dated this 15th day of February, 2017, at Topeka, Kansas.

s/ Daniel D. Crabtree
Daniel D. Crabtree
United States District Judge