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Public Safety Substance Abuse Newsletter

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November Name That Drug: A Cheap and Easy Date

This month's mystery drug is truly a drug of mystery. It is a precursor to a rather large family of drugs that dominated the American drug renaissance of the 60s and 70s. Yes, we're being a bit cheeky about the renaissance label, but this month's drug does have a notable roll in the ultimate development of important drugs of that time. Not well known is that this month's drug provided a chemical pathway to the creation of an important set of medications that can abort migraine headaches. Now for some veteran readers, the headache clue is an instant giveaway. For a novice drug abuser, this month's drug is very accessible and very affordable. The drug is a cheap date. A trip to the local home and garden shop will enable a devoted fan to find more than enough of this drug to get high. For that matter, a springtime stroll through an urban park will ordinarily do the same.

Scratching your head right now wondering what this drug is all about? This month's drug will do that. This drug is one chemical in a class of drugs that disrupt the smooth operation of the brain's limbic system; it scrambles sensory input thoroughfares in the brain by sending messages of

sight, taste, sound and touch to erroneous destination points. The redirection of chemical messages in the brain results in an unpredictable and sometimes frightening set of experiences. The ultimate endpoint of this drug's effects is nerve cells and receptor complexes associated with vital monoamine neurotransmitters serotonin, dopamine, and norepinehprine.

This drug has found a cultural niche in the drug habits and proclivities of adolescents and young adults. Because of easy access and affordability, it is a top choice for more indolent abusers. More intrepid abusers tend to opt for a more rarefied form of this month's drug. By undertaking a form of distillation chemistry, this month's drug can be converted into a more powerful incarnation. Ironically, this month's drug and all related substances came about by accident. The original establishment of this class of drugs occurred as a result of a fluky type of fungus that grows on ryes and other breads. The *ergot* fungus, as it turns out, produces a set of structurally identical alkaloids that work in the brain in like fashion to this month's drug. The *ergot* fungus promotes the presence of a chemical called ergotamine. Ergotamine has powerful properties as a vasoconstrictor. As a result, it has been conjured into a prescription medication called *Cafergot*. This drug is an effective means of aborting certain types of migraine headache. *Cafergot* is used worldwide.

Police officers who come into contact with users of this month's drug routinely cite its powerful effects in dilating pupils. In fact, dilation of the pupils is the hallmark symptom of this drug's use. The dilation of the pupil can be so extreme that the iris (colored area of the eye) is so effaced that it can no longer be seen. When that happens, a user's eyes are said to be "rimmed out." Other symptoms of this drug's use include gooseflesh (piloerection), flushed facial appearance, rapid heart rate, elevated blood pressure, and a rapid internal clock. The drug is difficult to detect in urine. This drug also affects speech. Users will undertake multilateral conversations with themselves. As users talk to themselves, they will become very inwardly focused. While high, users will speak near entirely in the first person. This drug can also cause unexpected emotional outbursts. Crying and laughing jags are common.

This drug's more potent extracted sibling is a true drug of lore. Although originally synthesized back in 1918, this power-packed iteration did not really attract much attention until the early 1960s. It was then that Dr. Timothy Leary proclaimed his now famous incantation to "turn on, tune in, drop out." This month's mystery drug was the chemical starting point for the drug that most enamored Dr. Leary. That drug was Lysergic Acid Diethylamide (LSD). As LSD use took off, this month's drug lagged behind as a less potent relative that was the choice of substance abusing ne'er do wells. Enterprising botanists contributed to the growing knowledge base surrounding this family of drugs by pointing out that this month's drug can be easily culled from an unremarkable, ordinary garden plant. In fact, it is the seeds of the plant that contain concentrated quantities of the drug. The plant and its seeds are legal to possess and grow.

Called "*pearly gates*," "LSA," or "*saucers*" (a reference to the wildly dilated pupils it causes) the plant that produces the drug can be easily found just about anywhere in the United States. Becoming mature in the springtime makes the occasions of its use a spring or summer phenomenon. The flowers from this plant are attractive and they make nice editions to gardens and parks. The distinctive coloring makes it easy to find in a scavenger hunt. Adolescents are particularly adept at finding the plant and collecting the seeds contained therein.

Getting high on this drug is easy. Eat the seeds. For the connoisseur, there are widely circulated formulas for making a psychoactive tea from the seeds. Some drug websites have posted additional formulas for more pure extraction of the raw chemical. But for kids, ingestion of a handful of seeds is all it takes to turn on, tune in, and tune out. The high lasts for 3-6 hours. It is rather difficult to overdose on this drug, although platoons of sick teenagers are dropped off at emergency rooms every spring suffering from tachycardia and over-stimulation of the sympathetic nervous system. Some are just frightened--stiff by the drug's effects on their emotions. Others yet become very concerned when sight and sound are distorted.

By now, most readers have probably figured out that the plant mentioned above is the Morning Glory plant. The seeds for this plant can be purchased at nurseries and home improvement stores. The seeds contain lysergic acid, a precursor to alkaloids that are produced by the ergot fungus mentioned previously. About one-sixth the potency of sibling LSD, the drug is capable of causing many LSD like effects. Some of the effects can be profound. Just ask the original habitants of Jamestown. It's ventured by some historians that allegations of witchcraft and the histrionic prosecution of alleged satanic-leaning residents occurred as a result of community ingestion of ergot-contaminated breads. The premise lies in the hallucinogenic potency of ergot alkaloids (LSA, LSD-like chemicals) and how settlers may have hallucinated their claims of witches, devil worship, and flying brooms.

This month's mystery drug: *Lysergic Acid*

(If you first identified the *Morning Glory* plant as the culprit, you too are correct.)

Drug Abuse Recognition (DAR) and Drug Recognition Expert (DRE) influence and symptom classification: *Hallucinogen*

Oxycontin Update: Manufactures Update of Time-Release Matrix Experiences Mixed Results

Oxycontin abuse in America has changed the political and social landscape on how we deal with prescription drug abuse. Oxycontin is a time-release form of the veritable narcotic oxycodone. This narcotic-analgesic has been in the American pharmaceutical formulary for generations. It is a narcotic approved to treat moderate to moderately severe pain. The drug has been sold in a number of concoctions that include products like *Percocet, Percodan, Roxicodone, and Tylox.* Some 15 years ago, Purdue Pharma brought a sustained release oxycodone product called Oxycontin to the market. Oxycontin was designed as a means of treating chronic or intractable pain. The drug was an instant hit with needy patients. It was also an instant hit for non-medical users who were looking to get high. In short order, the drug became one of the most nefarious drugs of abuse. Oxycontin abuse took root in the backcountries of Kentucky and West Virginia. Within a few years, it surpassed hydrocodone and became the most dominant prescription drug of abuse on the streets.

Oxycontin tablets are plain looking cylindrical tablets marked on one side with the milligram concentrations (20, 40, 60, and 80) and a stamp of "OC" on the back. The tablets come in a

variety of colors, with the green 80-milligram variant being the most sought after on the street. Oxycontin abusers have easily converted the time-release matrix of the tablet into "immediate release."
By dissolving in water and evaporating off the unwanted contents, an Oxycontin abuser can quickly set the drug up for fast and near total absorption into the bloodstream. In its base time-release form, Oxycontin is absorbed into the bloodstream in a flat trajectory over the course of a 12-hour period. In the time-release format, the drug is unable to deliver the fast hitting opiate high that opiate abusers desire. Oxycontin abusers have chosen to smoke or inject the "distilled" drug; some even choose to snort it. The high is extremely powerful. Oxycodone's fast transition of the blood-brain barrier allows for an oxycodone high to be as powerful as heroin. For some heroin users, the switch over to Oxycontin for I.V. injection is a no-brainer. Many a heroin user experimenting with intravenous injection of Oxycontin found a high that was explosive and durable. What held back a mass switch of brand was price and access. Oxycontin has been comparatively more expensive and more difficult to acquire than heroin.

Following years of pressure to do something to reduce the potential for Oxycontin abuse, the manufacturer created a new matrix that is allegedly less amenable to tampering and abuse. This new format for Oxycontin is called Oxycontin OP. The older version of Oxycontin OC is no longer manufactured and is no longer found on pharmacy shelves. The newer format has a matrix that is by all measurements, quite different than the old one. The OP format has a waxy, sticky base that makes it noticeably more difficult to dissolve and separate.

Many long-term patients now claim that the drug does not work. Patients fill online bulletin boards with complaints of GI tract distress, nausea, and an uneven analgesic effect. There have been reported mass movements of old Oxycontin patients over to Opana, a sustained-release formula of oxymorphone. Adding to the chorus of complainers are regulatory and law enforcement personnel who say that the new version of Oxycontin OP, although less abusable than its predecessor, is still exploitable by the determined. The online bulletin boards visited by nonmedical abusers of Oxycontin now report several different methods to defeat the OP matrix. It seems that Purdue Pharma cannot win.

The abuse of Oxycontin has led to hundreds of overdose deaths and legions of the addicted seeking treatment. When properly used, the drug has given lives back to many thousands of crippled patients who had given up on life. The legend of Oxycontin is uncertain. For the moment, no one seems too happy with the change from Oxycontin OC to Oxycontin OP.

Factors in Nonmedical Prescription and Over-the-Counter Drug Abuse by Adolescents

Adolescent nonmedical prescription drug abuse in the United States is on the rise. Recent reports of increased use of prescription and non-prescription drugs by teenagers have stirred anxiety and a bias towards action on the part of parents and various authorities. For instance, in the large suburban community of Santa Clarita, California, Hart Unified School District parents and school officials embarked on an ambitious program that instituted a voluntary student drug testing program in the local junior high and high schools system. Nearly 1000 students have been enrolled in the drug-testing program called *Comprehensive Alcohol and Drug Reduction and*

Education or CADRE for short. In addition to random voluntary student drug testing, CADRE includes intensive parent and student substance abuse awareness seminars at the dozen or so campuses located throughout the school district. CADRE is funded through the auspices of a Department of Education grant with the stated goals of reducing absences from school and high school drop outs, as well as other undesirable student behaviors related to drug and alcohol use. Voluntary random drug testing was seen as a means of reducing prescription and illicit drug abuse that was tied to poor attendance and erratic student performance.

MEDTOX *Drug Abuse Recognition (DAR)* personnel have provided hundreds of hours of instruction to the CADRE program. Over the course of this successful program, some troubling trends in the misuse of prescription and over-the-counter drugs have been identified. One trend that was identified was the use of "cabinet parties." At these party sites, students bring prescription drugs that they have scooped from parent and family medicine cabinets. These drugs are then shared with others who have been invited to the party. Cabinet parties boast of *Vicodin, Oxycontin, Valium*, codeine cough syrups, and stimulants. Kids who take these drugs know little of what it is that they are putting into their systems. Oftentimes cabinet parties put students in emergency rooms for treatment of overdose or injury suffered while stuperous. Over-the-counter drugs are frequently found at these parties as well. In particular, *dextromethorphan*-based cough syrups and antihistamines are popular with adolescents. Both prescription and over-the-counter drugs pose a serious threat to the health and safety of young boys and girls.

Earlier this year, a University of Kentucky study published data from a study of adolescent drug use trends, an investigation that was funded by the National Institute on Drug Abuse (NIDA)[1]. In 2008, a *Monitoring the Future* study of student drug use patterns was published. That study involved a large survey of regular attending junior high and high school students. Up to this point, there had been little study done of populations of truants, dropouts, homeless and even institutionalized youths. The University of Kentucky report looked at these adolescent subpopulations. In particular, the study looked at the incidence of prescription and non-prescription drug use amongst adolescents in residential care for antisocial behavior.

In 2007, a paper published by one of the authors of the University of Kentucky study (Mc Cabe et. al 2007) established that prescription drug abuse by adolescents was a significant predictor of addiction to these drugs in adulthood. And although there is a dearth or information or research related to this phenomenon, it has been established that prescription drug abuse in adolescence is associated with bad student outcomes, such as lower academic achievement, delinquency and unprotected sexual intercourse[2]. It is these adverse outcomes that the CADRE program seeks to block by means of random voluntary drug testing and student/parent education.

The instant University of Kentucky study involved interviews of 723 adolescents residing in 32 Missouri Division of Youth Services rehabilitation facilities. Just shy of half of the respondents (43%) reported lifetime abuse of prescription drug medicines. The responses indicated that many of these youths abused drugs of multiple classes. Abused prescription drugs include opiates, barbiturates, and tranquilizers. Non-prescription drugs of abuse included over-the-counter drugs and a slew of illicit substance such as marijuana, cocaine, *Ecstasy*, and alcohol. More than half of the students who reported prescription drug abuse did so on more than 10 occasions; sadly, 12% of prescription drug abusers reported more than 100 instances of lifetime abuse.

There were some gender differences in the abuse of prescription drugs. Girls abused these drugs at a rate nearly 15% greater than boys. Overall, prescription drug abusers in this study were white, older and more likely to be girls. Of interest is a note that prescription drug abusers, compared to non-prescription abusers, were more likely to live in a small town. A number of other correlates within the population of prescription drug abusers stood out. Compared to non-prescription drug abusers, prescription drug abusers tended to experience more head injuries and more frequent episodes of loss of consciousness. A significantly larger percentage of prescription drug abusers reported a psychiatric disorder diagnosis and a greater degree of anti-sociality as evidenced by scores on the Antisocial Process Screening Device (APSD). They were also more likely than non-prescription drug abusers to have used substances from all category types of psychoactive drugs. And although prescription drug users did not differ much from non-prescription drug users in the incidence of past-year violent crime, they did commit noticeably more past-year property crime. Prescription drug users reported earlier first contact with police and first criminal offense as compared to their non-prescription abusing cohorts.

To date, prescription drug using youth present a troubling picture. They presented with serious medical and psychiatric problems; behavioral problems were very common. This group also reported more lifetime traumatic experiences, more histories of criminal victimization, and elevated levels of suicidal ideation. It could well be that a significant portion of these youths were attempting to self-medicate a treated or untreated psychiatric condition, a phenomenon that has been witnessed in adult abusing populations.

This study was a well-designed and probative effort at better defining the impacts and relationships caused by prescription drug abuse in adolescence. This type of drug abuse has leveled off somewhat in urban communities, but it seems to continue to hemorrhage in more rural areas. Efforts to stem adolescent prescription drug abuse may be approachable through those means employed by the Hart Unified School District in California. Only time will tell. For sure though, communities are remiss if they sit around and wait for this problem to resolve itself.

Communities and organizations may obtain more information about the CADRE program by contacting Mr. Andrew Gilberts at agilberts@medtox.com

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[1] Hall, M.T., Howard, M.O., Mc Cabe, S.E., Prescription drug abuse among antisocial youths, Journal *of Studies of Alcohol and Drugs*, November 2010: 917-924.
[2] Ellickson, P.L., Tucker, J.S., Klein, D.J., Saner, H. (2004) Antecedents and outcomes of marijuana use initiation during adolescence. *Preventative Medicine*, 39, 978-984.

News from Urban America: Candy Flipping Has Arrived

Recently, a new trend has emerged in America's high schools. Teenagers continuously looking for a new way to get high have brought forth their latest discovery: candy flipping. Candy flipping is most commonly undertaken by teenage *"ravers"* or *"shufflers,"* the latter a cohort of kids who dance in a particular shuffling manner. As if the impact of ecstasy alone was not damaging enough to young people, the drug is now being combined with LSD to create the phenomenon of candy flipping. Someone who is candy flipping is combining the effects of ecstasy and LSD by taking the drugs concurrent to one another. Female ecstasy users are sometimes referred to as *candy raver kids*. Candy flipping seems to be a semantic take off from the candy raver nom de guerre. Typically, a candy flipper takes a dose of ecstasy up to an hour before following it with a chaser of a hit of acid. The LSD effects are supposed to take off at about the time that ecstasy's effects wear off. At least that's how a candy flipper tries to plan it. The combined effects of these drugs may persist for 8-10 hours.

Glamorized in the 1960s as an integral part of the hippie movement in the United States, LSD (lysergic acid diethylamide) was thrust into the limelight by influential figures of the time. One figure of the time was Timothy Leary. Leary, a psychologist, encouraged the use of LSD for its alleged therapeutic value. LSD is a chemical derived from a quirky grain fungus typically found on rye bread; it was first synthesized in 1938 by Swiss chemist Albert Hoffman (1). The drug has had a storied career both in and outside of the United States. To this day, the drug remains a popular counter-cultural drug found in underground communities along the west coast. LSD is a psychedelic drug included in Schedule I of the Controlled Substances Act. Schedule I drugs have a high potential for abuse and serve no legitimate medical use (2). For readers of this newsletter who are DAR or DRE trained, LSD and ecstasy are drugs that are classified as hallucinogens.

Although both these drugs are hallucinogens, they work through distinctly different biological and neurological mechanisms. Ecstasy exerts its effects by triggering a large central release of the neurotransmitter serotonin. The result of this release is a significant set of sensations that cause an inner sense or warmth and social bondedness. Called the "hug drug" and "love in a bottle," the drug has become a big part of the techno music and rave scene. LSD precipitates a more traditional hallucinogenic experience. For LSD users, there are distinct distortions in the way sensory inputs are processed by the brain. Sight, taste, sound and tactile perceptions all become jumbled and confused. Colors and noises are all potentiated, sometimes to a point where the experience can be frightening to the user. In low doses, the drug can cause a lessening of inhibitions and anxiety. LSD and ecstasy are distinctly different hallucinogens that both conflict and complement with those effects caused by the other.

A candy flipper may exhibit some or all of the following physical symptoms:

- Dilated pupils
- Grinding of the teeth
- Elevated heart rate and blood pressure
- Flushed appearance
- Loud voice; dominating speech patterns
- Goose flesh (piloerection)
- Sweatiness

- Fidgeting
- Weeping and crying
- Laughter and shouting

It remains to be seen if this latest trend affecting the use of ecstasy has any staying power. The DARS Newsletter will keep readers posted on future developments within the crazy world of the candy flipper.

1. Hofmann, Albert. *LSD-My Problem Child* (McGraw-Hill, 1980).
2. United States Department of Justice, Controlled Substances Act, Schedule I (May 2003)
3. *The Psychological and Physiological Effects of MDMA on Normal Volunteers*, by Joseph Downing, from Journal of Psychoactive Drugs, Vol. 18/4 1986.

Is it Possible to Become Addicted to Food?

Many of our Journal readers will begin the annual tradition of managing weight through Thanksgiving and Christmas. Most of us will make it through the holidays with a little extra weight put on. Some however will pack on new weight. And that new weight will be added to weight gained from the previous year. In fact, some of these people struggle with their weight in constant fashion that broaches on serious obesity. And even though these people make efforts to diet, they continue to overeat. They overeat despite a plethora of negative physical and social consequences.

Eating has biological and psychological roots in dopamine receptors located in the hypothalamus. This area of the brain is involved in reward processing that is intricately involved with drug addiction and alcoholism. Researchers recently took a stab at elucidating the role of dopamine in eating[1]. They did so by implanting stimulating electrodes in the lateral hypothalamus of rates that had been prior trained in a "reward threshold task." All of the rats were given unrestricted access to food. The rats were then separated into three groups that had either unrestricted access, one hour daily access, or no access to "cafeteria energy food" in addition to their normal chow. The energy food for rats is comparable to cafeteria foods for humans.

The unrestricted group of cafeteria eating rats ate twice as much food than either of the two other restricted groups. They gained more weight than the others did as well. The unrestricted eating group elevated thresholds for experiencing reward and their eating habits were not reactive to aversive stimuli in the form of foot shocks. The group of rats that had a limited one hour access to the cafeteria energy food did not gain weight. But these rats ate much more cafeteria food than they did their regular chow. These rats became binge eaters, ravaging the energy food each time that they had a chance. The rats that were barred from the energy food lost weight, but their habits were identical to the other two groups once access to the energy food was obtained.

Researchers ultimately found that the D2 variant of the dopamine receptor was altered in the rats that had unrestricted access to chow and energy food. The dopamine receptor was not

functioning properly at vital reward centers in the brain. Evidently the feedback mechanism for sating the appetite of these rats was poorly integrated. What that meant in practical terms was that the high energy food over time became less "immediately" rewarding to these rats. It took more time and food consumption for these rats to be satisfied.

Mechanisms for cocaine and methamphetamine addiction follow much of the same reward pathway as eating. But there seems to be more effective treatments for cocaine addiction than there is for the obese who eat fattening foods. It looks like the most efficacious way to treat the phenomenon in humans is to restrict the access to fattening foods.

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[1] Johnson PM and Kenny PJ. *Dopamine (D2) receptors in addiction-like reward dysfunction and compulsive eating in obese rats*. Nat Neuroscience 2010 May; 13:635.

European Designer Drugs Hit American Shores: The Emergence of the "Legal High"

Nopaine? BZP? Meow-Meow? Do any of these drugs ring a bell? Well if they do not sound familiar to you now, it is not a surprise. Apart from the periodic essays from this news journal, most Americans are unfamiliar with these drugs. The substances are members of a new genre of drugs that entrepreneurial scientists have created to skirt drug laws in their countries of origin. In underground laboratories in Europe and the United Kingdom, rogue chemists are eagerly tweaking the molecular structures of well-known psychoactive compounds to create a new species of drugs. These new concoctions exploit a chemical gray zone, and as a result, are currently outside the reach of the government controlled substances acts.
In the United States, law enforcement agencies have been grappling with one such compound. K2-Spice is a plant material that has been treated with several synthetic cannabinoids. Ostensibly sold as room odorizer or potpourri, the chemicals that make up spice are outside the boundaries of conventional drug laws. Spice has quickly grown into a fad and has burrowed into drug using communities in nearly all 50 states. Until very recently, there was not a drug test available to identify spice users. The trend in manufacturing these designer drugs is to move fast and stay one step ahead of the pursuing government regulators. At the moment, Federal legislation in response to spice is uncertain. A number of states however have taken action to ban it.

The characters behind the scenes of this drug movement are not well known. They are a motley crew of pseudo-laboratory technicians who are creating these drugs on the fly. In an October news piece in the Wall Street Journal, one such entrepreneur was profiled. A 49-year-old unemployed construction worker, Mr. David Llewellyn of Scotland, has emerged as a representative of the designer drug movement. A former crack cocaine addict, Llewellyn has extensive experience in the illicit drug market. He also has a palette for drugs in much the same way that a vintner has a nose for wine. In the laboratory, Mr. Llewellyn can test new drugs on the fly. He and a partner work out of an underground chemistry lab. There the two pick through the work of research scientists who have published academic papers that summarize their work on neurotransmitter systems in the brain. Many of these papers are available to the public over the Internet. Along the academic way, neuro-scientists either created drugs or isolated special

substances that interacted with vital receptors in the brain. From this base of knowledge, Mr. Llewellyn launches his synthesis.

Largely unimpeded by the law, Llewellyn and other would-be chemists have created a variety of substances that have stirred worldwide concern. In addition to spice cannabinoid products, BZP and mephedrone are also out in the market. Most of these drugs are sold over the Internet. Good percentages are manufactured in China. A worldwide set of distribution systems ensures fairly free access to the drugs. Very few of these substances have withstood the rigors of testing; none of them have been studied for their effects on human beings. Mephedrone, for instance, is a drug that has a chemical lineage that blends amphetamine and cathinone structures together to create a hybrid psychedelic stimulant. Cathinone is the psychostimulant that powers the drug khat, a plant that is grown in Africa and smuggled to the United States. Mephedrone has obvious addictive potential. Anecdotal information indicates that the drug can cause an amphetamine-like constellation of effects, including all the onerous symptoms of paranoia, anorexia, and hyper-vigilance. The designer drug BZP is a piperazine-based drug that also possesses marked stimulant properties. Long ago, BZP was proposed as a novel antidepressant drug, but researchers discarded the idea once they learned that it had stimulant capabilities similar to amphetamines. Cases of BZP abuse have been called into the DAR Hotline from locations in Texas and Kentucky.

The market demands for drugs that provide "legal highs" does not look to abate any time soon. It is likely that Mephedrone, BZP, and spice are here to stay. In instances where unusual behavior and drug use symptoms cannot be forensically tied to a positive drug test result, readers should carefully consider the possibility of designer drug involvement. Callers to the DAR Hotline frequently communicate their frustrations in not being able to tie suspected marijuana users to a positive test for THC. The MEDTOX DAR Hotline staff refers these callers to the spice testing program. Dozens of suspected cannabis users were ultimately tied to spice ingestion by subsequent lab testing for spice metabolites. Spice intoxication results in traditional cannabis signs and symptoms for Drug Abuse Recognition (DAR) examinations.

Readers who would like more information about spice (designer cannabinoid) testing should contact a MEDTOX government sales representative at 877-716-6267 for more information.

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Sincerely,

MEDTOX Journal

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