



# CNRA Connections

Center for Neurobehavioral Research on Addiction

Department of Psychiatry

## Fast Facts on Synthetic Marijuana

CNRA's addiction medicine expert Dr. Michael Weaver shares what we know (and don't know) about these dangerous drugs.



### WHO USES IT?

Synthetic marijuana (SM) use is most prevalent among young adults, primarily male, single, in their 20's, but ranging from teens to 40 years old. In general, this population has lower levels of education and income. SM use may be higher among regular marijuana users, university students, and dance club attendees. Among high school seniors, annual prevalence of SM use was 11% in 2011 and 2012, but dropped to 8% in 2013, and remains more prevalent than any illicit drug except marijuana.

### WHAT IS IT?

The primary chemical in marijuana is delta-9- tetrahydrocannabinol (THC), which has effects throughout the human body, especially the brain. Compared to THC, chemicals in SM are often more potent and may last longer, which can lead to greater toxicity. SMs were originally synthesized for research purposes in different university laboratories. SM products used recreationally include mixtures of different SM compounds sprayed on plant matter of unknown content to resemble potpourri or incense. There is substantial variability in product composition and wide concentration ranges for SM, which adds to the risk of toxicity.

waterpipe, although it can be consumed orally or intranasally. Acute effects are similar to marijuana, including alteration in mood, bloodshot eyes, and rapid heart rate. Effects are reported to start within 10 minutes after inhalation, and most effects resolve after 2-6 hours. Some regular users of marijuana may use SM as a substitute to relieve marijuana withdrawal symptoms.



Synthetic marijuana packaging typically is colorful and enticing

SM packaging is colorful and attractive, with enticing names for the products, that attract younger individuals to try them. The term "Spice" is now generally applied to all products containing SM, regardless of branding. SM is primarily smoked, such as a joint, bowl, or

### WHAT ARE THE SIDE EFFECTS?

Commonly reported side effects include dry mouth, lightheadedness, and headache. Other unwanted

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Newsletter layout and design by Kathryn Tipton

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# Director's Message



**Joy Schmitz, Ph.D.**

Among CNRA's principal activities are education and dissemination of scientific information. Recently, our Center was honored to participate in the **UT Health Annual Public Forum** hosted by the Neuroscience Research Center (NRC). Aptly named "**The Brain on Drugs**," the free event on Saturday, April 11, drew an audience of over 200 people interested in learning about the health effects and consequences of drug abuse and addiction. Panelists included Doctors **Michael Weaver**, CNRA Medical Director; **Scott Lane**, CNRA Neurobehavioral Laboratory Director; and **Dawnelle Schatte**, Child Psychiatry Clinic Co-Director at Baylor College of Medicine. As moderator, I posed questions and facilitated discussion on topics including drug use in adolescents, addiction and comorbid mental illness, prescription drug abuse, and effective medication and behavioral treatments for addiction. Much of the discussion focused on the current concern over the rise in synthetic marijuana use among teens – how this so-called "fake weed" mimics the effects of cannabis in the brain but with greater potency and toxicity, leading to record numbers of emergency room visits for treatment of life-threatening overdose symptoms. In response to the outpouring of interest, this issue of **CNRA Connections** includes a feature story by Dr. Weaver on the public health risk of synthetic marijuana. Thanks again to the UTHealth NRC for this valuable opportunity to raise public awareness about addiction and our research at the CNRA.

Below are photos from the Annual Public Forum, courtesy of Dwight C. Andrews, UTHealth Office of Communications (also available on [facebook.com/UTHealthNRC](https://www.facebook.com/UTHealthNRC)).



CNRA Counselors Carly Malcolm-Hoang and Kathryn Tipton



Drs. Dawnelle Schatte, Michael Weaver, Joy Schmitz, Scott Lane





# Recent Awards and Honors

- ◇ **Dr. Scott Lane** was named the new director of research at the Harris County Psychiatric Center.
- ◇ **Dr. Anka Vujanovic** was the chair of the symposium entitled *Post-traumatic Stress and Substance Use Disorders: Treatment Initiatives and Challenges* at the annual College on Problems of Drug Dependence meeting in Phoenix, Arizona, June 2015.
- ◇ **Dr. Darrow Khosh-Chashm** presented a poster entitled *Impact of Benzodiazepine Use on Retention and Compliance, Relapse, and Safety in Buprenorphine-Maintained Patients* at the International Narcotics Research Conference in Phoenix, Arizona, June 2015.
- ◇ **Chief Resident, Nilesh Tannu, MD, MS**, received a URPOP Primm-Singleton travel award to attend the 77th Annual Scientific Meeting of the College on Problems of Drug Dependence, June 2015, awarded by the Under-Represented Populations Committee of the CPDD. He presented a poster entitled *Proteomics Analyses: Evaluation of PPAR-Gamma Agonist Treatment for Chronic Cocaine Administration*.
- ◇ **Dr. Angela Heads** received the spring 2015 travel award from the Postdoctoral Association at UT Health to support her research presentation *Distress Tolerance Moderates the Relationship Between Trauma Symptoms and Depression in Trauma Exposed Substance Users* at the annual College on Problems of Drug Dependence meeting in Phoenix, Arizona, June 2015.
- ◇ The UT Health Committee on the Status of Women named **Dr. Angela Stotts** the 2015 winner of the Distinguished Professional Woman Award.

## CNRA Summer Trainees

**Shavonia Gants, B.S., M.S.**, is a second year medical student at UT Houston Medical School. She was the recipient of the Saltzberg Research Fellowship and worked with Dr. Anka Vujanovic on a summer research project at the UT Harris County Psychiatric Center. Her project used behavioral tasks as well as self-report measures to evaluate distress tolerance in trauma-exposed, acute-care psychiatric inpatients.

**Katie Kaminski** is an undergraduate psychology student from Mercyhurst University in Erie, Pennsylvania. She was a recipient of the Psi

Chi Undergraduate Summer Research Grant and worked with Dr. Jin Yoon on a summer research project. This project included analyzing collected data on impulsivity and its relation to cocaine use and treatment outcome.

**Lillian Tran** is a second-year medical student at Paul L Foster School of Medicine with an interest in psychiatry. She worked with Dr. Margaret Wardle on a summer research project investigating the relationship between inflammation and cocaine-related behaviors.

## CNRA: About us MISSION:

*To develop evidence-based treatment for substance use disorders (SUDs) using decisions informed by behavioral neurosciences.*

## AIMS:

*In pursuit of this mission the CNRA aims to:*

- Map out the neurological, behavioral, and clinical mechanisms that contribute to drug addiction
- Target key mechanistic processes in the development of SUD treatment
- Evaluate treatment efficacy using innovative clinical trial designs and statistical methods

## Core Faculty:

*Prashant Gajwani, M.D.*

*Charles Green, Ph.D.*

*Scott Lane, Ph.D.*

*Joy Schmitz, Ph.D.*

*Anka Vujanovic, Ph.D.*

*Margaret Wardle, Ph.D.*

*Michael Weaver, M.D.*

*Jin Yoon, Ph.D.*

## Interested in research?

### Contact us!

## (713) 486-2823

Rolanda Johnson  
CNRA Program Manager

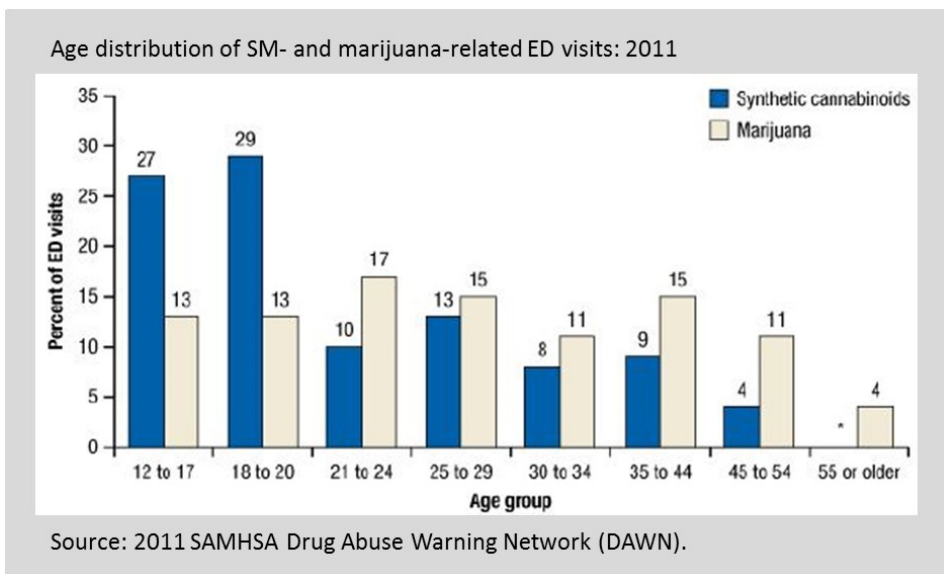
## Synthetic Marijuana, continued from page 1

ed negative physiological effects include sweating, tremors, and shortness of breath. Rapid heart rate is common with SM use—similar to marijuana—and may be severe, along with high blood pressure and chest pain. Adverse psychological effects are common with SM, and may include anxiety, trouble thinking clearly, agitation, paranoia, and delusions. Reports indicate that SM can cause acute psychosis—which appears more likely in users with family history of psychosis—as well as worsen preexisting chronic psychotic disorders. Psychotic symptoms can persist for a significant time, from one week to five months. Severe SM toxicity requiring emergency treatment has included seizures, acute kidney failure, and heart attack. Deaths have been reported with SM due to heart attack and suicide.

There are no studies of long-term effects of SM. Smoking SM results in inhalation of burned unidentified plant material, which may have adverse effects on the lungs. At least one SM compound may potentially cause cancer.

#### WHY IS SM A GROWING PUBLIC HEALTH CONCERN?

There has been a dramatic increase in the number of SM-related emergency department (ED) visits in the United States over recent years. According to the Drug Abuse Warning Network (DAWN), a public health surveillance system that monitors drug-related ED visits in the United States, there were approximately 11,406 ED visits linked to SM in 2010. Compare that rate to the year 2011, when DAWN reported an estimated



28,531 ED visits linked to SM. While the age distribution of ED visits is not surprising, it is quite concerning. Rates are highest among younger age groups. For patients aged 12 to 17, the rate of ED visits doubled and for patients aged 18 to 20, ED visits increased fourfold. As shown in the figure, among the younger age groups (12-20 years old) ED visits for SM (55%) far exceed ED visits for marijuana (26%). About 12% of the SM-related ED visits result in admission to the hospital.



SM packets, product, and paraphernalia

#### CAN SM BE DETECTED?

Urine or serum toxicology screens are unable to detect all of the SM that have been synthesized, posing a major diagnostic and monitoring challenge for clinicians. Although laboratory testing is expanding, widespread standardized SM testing is not yet available in most clinical practice settings and laboratories. Individuals frequently report that the lack of detection on standard urine drug screening tests is a reason for SM use. For example, populations on criminal justice probation may use SM to evade detection by probation officers. Since SMs are not detected by routine drug screens, healthcare providers relying solely on laboratory testing may be misled to believe that illicit drugs have not been used. Conversely, the presence of routinely detectable illicit substances does not rule out the presence of SMs, since polysubstance use is typical in this population.

Clinicians should consider direct inquiry about SM use, particularly among young adults presenting for acute medical care with signs or

symptoms that could indicate toxicity. It is helpful for clinicians to ask about specific products by name, or perhaps "synthetics" in general, since patients may not be aware of designations used by medical personnel, or of different street names for similar products. Follow-up questions should be asked about frequency, patterns of use, and other effects.

### WHAT ARE THE SIGNS OF USAGE?

Clinical clues may help identify SM use. Bloodshot eyes are an indicator of SM intoxication, as well as marijuana. Some patients presenting for emergency treatment may still have the package that contained the SM. This can be examined for possible identification of common "brand" names, and potentially any remaining content can be sent to a laboratory for analysis. Internet web sites may be helpful for identification of specific substances ingested due to their

rapidly changing appearance. The presence of paraphernalia such as a pipe for smoking could indicate SM use, and a strong smell of perfume or cologne may be an attempt to mask the smell of recent smoking.



SM is frequently referred to as "Spice"

### HOW ARE THE SYMPTOMS MANAGED?

No specific antidotes are available for SM toxicity. Most non-psychiatric symptoms appear self-limited and resolve within one to several days with supportive treatment. Unpleasant psychological effects of acute intoxication, such as anxiety, agitation, or paranoia

may be managed with supportive treatment. Placing the distraught user in a quiet environment and maintaining gentle contact is often sufficient until the acute effects subside. Psychosis due to SM intoxication has been managed with monitored observation. Sedation may be required if the patient is markedly agitated and at risk for harm to self or staff. If psychiatric symptoms persist longer than one or more weeks after discontinuation, the patient should be evaluated carefully to determine whether he or she has a co-occurring primary psychiatric disorder, which then should be treated with specific therapy.

Abrupt discontinuation of SM could result in withdrawal symptoms such as nausea and irritability, similar to that with marijuana cessation. However, SM withdrawal is not life-threatening, although uncomfortable.

## Community Awareness

Dr. Michael Weaver presented on Medication Assisted Therapies at the Houston-Harris County Office of Drug Policy 6th Annual Community Drug Awareness Day. He also participated as a panelist and speaker at the Prevention Resource Center's Summit on Synthetic Marijuana (photos below).



Panelists (from left): Det. Aaron Crowell, Dr. Michael Weaver, Asst. D.A. Justin Wood, SAC Joseph M. Arabit, Dr. Jeff Walterschied, Dr. Iram Kazimi



Dr. Michael Weaver, CNRA medical director



# Research Update

## 2015 Selected Faculty Publications

- Clark CD, **Weaver MF**: Prescribing beer for hospitalized patients with alcohol use disorder. *American Journal of Bioethics*, 15(7):61, 2015.
- Clark CD, **Weaver MF**: Balancing beneficence and autonomy. *American Journal of Bioethics*, 15(7):62-63, 2015.
- Cobb CO, Blank MD, Morlett A, Shihadeh A, Jaroudi E, Karaoghlanian N, Kilgalen B, Austin J, **Weaver MF**, Eissenberg T: Comparison of puff topography, toxicant exposure, and subjective effects in low- and high-frequency waterpipe users: a double-blind, placebo-control study. *Nicotine & Tobacco Research*, 17(6):667-674, 2015.
- Compton P, **Weaver MF**: Responsible Opioid Use. *Journal of Pain and Palliative Care Pharmacotherapy*, 29(2): 166-168, 2015.
- Dias NR, **Schmitz JM**, Rathnayaka N, Red SD, Sereno AB, Moeller FG, **Lane SD**: Anti-saccade error rates as a measure of attentional bias in cocaine dependent subjects. *Behavioral Brain Research*, in press.
- Lv MH, Tan YL, Yan SX, Tian L, Chen DC, Tan SP, Wang ZR, Yang FD, **Yoon JH**, Zunta-Soares GB, Soares JC, Zhang XY: Decreased serum TNF-alpha levels in chronic schizophrenia patients on long-term anti-psychotics: Correlation with psychopathology and cognition. *Psychopharmacology*, 232, 165-172, 2015.
- Ramesh D, Lakeyser, IM, **Schmitz JM**, **Lane SD**, Marwit JH, Kreutz JS, Moeller FG: Prevalence of traumatic brain injury in cocaine-dependent research volunteers. *The American Journal on Addictions*, in press.
- Stotts AL, **Vujanovic A**, Heads A, Suchting R, **Green CE**, **Schmitz JM**: Avoidance and inflexibility in predicting response to contingency management for cocaine use disorders: A secondary profile analysis. *Psychology of Addictive Behaviors*, 29, 408-13, 2015.
- **Vujanovic AA**, Niles BL, Abrams JL: Mindfulness and meditation in the conceptualization and treatment of posttraumatic stress disorder. In E. Shonin, W. Van Gordon, & M. Griffiths (Eds.), *Mindfulness and Buddhist-derived approaches in mental health and addictions*. New York: Spring Press, in press.
- **Weaver MF**, Hopper JA, Gunderson EW: Designer Drugs 2015: Assessment and Management. *Addiction Science & Clinical Practice*, 10:8, 2015.
- **Weaver MF**, Jones HE, Wunsch MJ: Alcohol and Other Drug Use During Pregnancy: Management of the Mother and Child. In A. Herron, T. Brennan (Eds.), *Essentials of Addiction Medicine*, 2nd Ed., Chevy Chase, MD: American Society of Addiction Medicine, Inc., pp 473-477, 2015.
- Weidberg S, Garcia-Rodriquez O, **Yoon JH**, Secades-Villa R: Interaction of depressive symptoms and smoking abstinence on delay discounting rates. *Psychology of Addictive Behaviors*, in press.
- Wu HE, Mohite S, Ngana I, Burns W, Shah N, Schneider L, **Schmitz JM**, **Lane SD**, Okusaga OO: Hospital length of stay in individuals with schizophrenia with and without cocaine positive urine drug screens at hospital admission. *Journal of Nervous and Mental Disease*, in press.
- **Yoon JH**, **Lane SD**, **Weaver MF**: Opioid analgesics and nicotine: More than blowing smoke. *Journal of Pain & Palliative Care Pharmacotherapy*, in press.

# Clinical Corner

## *Secondhand Drinking*

Author and national keynote speaker **Lisa Frederiksen** discusses the adverse impacts that drinking behaviors have on others.



### What is secondhand drinking (SHD)?

It refers to the negative impacts of a person's drinking behaviors on others.

Drinking behaviors include:

- ◆ Verbal, physical, emotional abuse, and neglect;
- ◆ Unplanned, unwanted sex or sexual assault;
- ◆ Driving while impaired;
- ◆ Creating a safety risk or productivity burden for co-workers when reporting to work hung-over;
- ◆ Being so drunk and not aware of one's surroundings or actions, always putting sober friends and family in the role of protector or monitor;
- ◆ Routinely passing out at night, leaving the rest of the family to continue the nighttime routine without help or company.

Drinking behaviors are the unintentional (assuming the person doesn't behave this way when sober) behaviors a person exhibits as a result of the brain changes caused by the ethyl alcohol chemical in alcoholic beverages interrupting the chemical portion of the brain's electro-chemical signaling process. This interruption changes brain function, which in turn

changes what a person thinks, feels, says and does.

Drinking behaviors occur with a variety of drinking patterns, including: binge drinking, heavy social drinking, alcohol abuse and alcoholism. Collectively these are known as alcohol misuse.

### Why the term?

We have been talking "around" the symptoms and causes of secondhand drinking for ages. We use concepts and terms, such as:

- ◆ *Codependency, Enabling* in addiction treatment and recovery circles.
- ◆ *Absenteeism, Lost Productivity, Safety Risks, Health Care Costs, Employee Wellness* in the workplace.
- ◆ *Mental Illness, Physical and Emotional Health Diagnoses* in our visits with doctors.
- ◆ *Divorce, Loss of Employment, Domestic Violence, Child Abuse, Alcohol-related Crime and Recidivism, Drunk Driving and Public Health and Safety* in our workplaces, families, friendships and communities.

But these concepts and terms only address the symptoms. Just as treating asthma or respiratory infections or ear infections without removing the secondhand smoke

only address the symptoms of the underlying cause – another person's cigarette smoke.

Thus using the common term, secondhand drinking, we can help people affected by it understand what they need to do to change their situations.

### Why is secondhand drinking a serious concern?

SHD directly affects 90 million Americans (the moms, dads, husbands, wives, children) and can affect up to 40% of an agency or company's workforce. It indirectly affects millions more (in-laws, co-workers, classmates and the community at large).

The primary cause of SHD's impacts on a person is its connection to stress. Coping with drinking behaviors triggers the fight-or-flight stress response system (FFSRS) centered in the limbic system, the "reactionary" part of the brain.

The FFSRS prepares a person to fight or run when faced with physical danger and causes a number of physiological changes to occur, for example, blood vessels to the skin to constrict to lessen blood loss in the event of injury; the digestive system shuts down to conserve glucose needed for energy to run or fight; and heart rate increases to push blood flow to large muscles to

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Secondhand Drinking, continued from page 7

allow a person to run more quickly or fight.

The FFSRS can lead to dysregulation of the cerebral cortex (the thinking part of the brain) so that a person reacts immediately without considering the options when confronted with physical danger. As a result, the brain “maps” the reaction (fight or flight) that kept the person safe. This map becomes a person’s default reaction the next time a similar triggering event occurs. This worked “back in the day,” when about the only immediate danger early man faced was physical danger.

Today, however, the FFSRS is more often than not triggered by anything but physical danger – emotional cues, for example, such as fear or anger, or thoughts or memories or worry.

Ongoing coping with SHD causes ongoing activation of the FFSRS. This in turn can cause a person to experience psychological and physical problems that interfere with school, work, family and relationships. These impacts include: stomach ailments, sleep disorders, migraines, headaches, changes in eating habits, dizziness, distracted “thinking,” depression, anxiety,

memory impairment, heart disease, digestive problems, constant worry.

A person chronically exposed to SHD wires in brain maps around the reactionary coping skills that kept them safe. These can include: yelling, crying or physically or verbally lashing out in anger; shutting down emotionally when in conflict or facing an angry person; working hard to please others; being hyper-aware of others’ feelings or actions and adjusting one’s own accordingly; or withdrawing from family, friends or activities out of embarrassment over the drinking behaviors.

These same general concepts apply to the negative impacts a person’s drug misuse behaviors have on others, for which the term is Secondhand Drugging.

### **Is there a way to reduce the risk that someone will experience secondhand drinking effects?**

Absolutely. When we help people understand the impacts (i.e., SHD-related stress), the cause (i.e., alcohol misuse) and the remedies (i.e., brain health and wellness tools – not discussed in this article), we help people avoid, protect them-

selves and change how they cope. We also help people who cause SHD to change drinking patterns.

### **About the Author**



Lisa Frederiksen is the author of nine books, including *If You Loved Me, You'd Stop!*, and a national keynote speaker, consultant and trainer.

She has spent more than 12 years immersed in 21st century brain research as it relates to substance misuse prevention, intervention and treatment; mental illness; addiction as a brain disease; effective co-occurring disorders' treatment; secondhand drinking | drugging; help for the family and related subjects. Her interest in this field stems from her forty years' experience with secondhand drinking. She is the author of hundreds of blog posts and numerous articles; has appeared frequently as a radio, television and Internet radio guest; and is the founder of BreakingTheCycles.com and SHD Prevention. She can be reached at:

[lisaf@BreakingTheCycles.com](mailto:lisaf@BreakingTheCycles.com).

## **Your Support Is Needed**

Contributions to CNRA help advance important research to develop science-based treatments for those who suffer from substance use disorders.

Donations can be made to:

UTHealth—CNRA,  
P.O. Box 301413, Dallas, TX 75303  
or by calling **(713) 500-5217**

CNRA counselors Carly Malcolm-Hoang, LPC-S and Rolanda Johnson, LPC-S represented the CNRA at the **Family Recovery Resource Expo and Symposium** on June 12, 2015 in Houston,



Texas. This community event highlighted the problem of addiction in families, and brought together local recovery related agencies and resources.

Lisa Frederiksen was featured as a keynote speaker and presented on secondhand drinking.



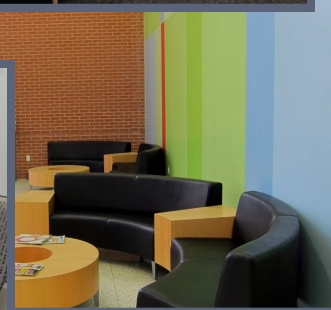
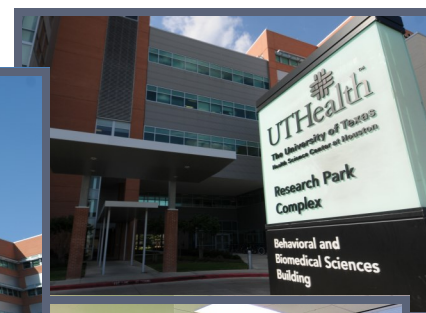
# Inside the CNRA

The CNRA currently has three ongoing studies of treatment for substance use disorders.

- ◆ Clinical Trial of Citalopram in Cocaine Dependence
- ◆ Cognitive-enhancing Dopamine Medications for Cocaine Dependence
- ◆ Treatment of Integrated Posttraumatic Stress and Substance Use

## CNRA Program Features:

- ◆ No Cost Treatment
- ◆ 100% confidential
- ◆ Medical & Behavioral Treatments
- ◆ Experienced and Professional Staff
- ◆ A Safe and Clean Atmosphere
- ◆ Free Parking and Metro Tickets
- ◆ Financial Compensation for Research Participation
- ◆ Funded by the National Institute on Drug Abuse (NIDA)



**Appointments:**  
**713-500-DRUG (3784)**

**Clinic Hours:**  
**Monday – Friday 7:30-4:00**

**Behavioral and Biomedical Sciences Building**  
**1941 East Road**  
**Houston Texas 77054**

<https://med.uth.edu/psychiatry/research/addiction/>