Our Mission
To develop solutions for the prevention and cure of alcoholism and related illnesses.

Repurposing Existing Drugs to Treat Addiction

Development of drugs to treat human disease is costly, requiring decades of effort and millions in research funding. To optimize this process, scientists are turning to more efficient drug discovery methods, such as testing the potential of drugs already approved by the U.S. Federal Drug Administration to address alternative medical conditions. Researchers in the labs of R. Adron Harris, director of the Waggoner Center, and Hitoshi Morikawa, associate professor of neuroscience, recently published papers studying the efficacy of diabetes, hyperlipidemia, and hypertension medications in treating addiction.

The drugs tested in the Harris study, including pioglitazone, tesaglitazar, bezafibrate, and fenofibrate, are peroxisome proliferator-activator receptor (PPAR) agonists, which activate PPARs to regulate glucose (diabetes) or lipid (hyperlipidemia) homeostasis. Each drug targets distinct PPAR isoforms (α, γ, and/or δ). Harris and colleagues found that two of the drugs, fenofibrate, which activates PPARδ, and pioglitazone, which stimulates PPARγ, reduced alcohol consumption in behavioral experiments of mice predisposed to high alcohol intake. Working with investigators from the Collaborative Study on the Genetics of Alcoholism, they analyzed genomewide association data of human alcoholics to identify genes that code for the different PPAR isoforms. Specific variants of the genes coding for PPARα and PPARγ were found in human models of alcohol dependence and withdrawal.

Harris said this “is the first study to combine human genetic studies of alcoholism with animal models of alcohol consumption to show a connection between PPARs and drugs acting on those receptors with alcohol abuse.” This overlapping evidence underscores the potential of PPAR agonists as possible addiction treatments.

These results were published in the journal Alcoholism: Clinical & Experimental Research. Other Waggoner Center authors include research scientist Yuri Blednov, graduate student Laura Ferguson, and research associates Jill Benavidez and Mendy Black.

The Morikawa study, largely conducted by former postdoctoral fellow Mickaël Degoulet, focused on disrupting the memories associated with drug-related sensory cues that cause recovering cocaine addicts or alcoholics.
to relapse. Drug-related cues can be external, like associations with people or places, or internal, such as physiological reactions to the drug. The association of these cues with the effect of addictive drugs in the brain will be learned.

Increased excitatory transmission at specific brain synapses is thought to underlie the learning of drug-associated cues. Degoulet and colleagues found that L-type calcium channels, proteins occurring in cardiac, blood vessel, and neuronal cells, are critical not only for causing but also for maintaining this increased transmission. Administration of the high blood-pressure medication isradipine inhibited these proteins in the brain, which not only blocked the increase in transmission but also promoted reversal of the increased transmission.

In behavioral experiments, rats learned to associate cocaine with a color-coded room and were then given a choice between rooms with and without the drug. After training, they expressed preference for the room with the cocaine. When researchers administered isradipine to cocaine-addicted rats, they soon no longer preferred the room associated with the drug. This effect persisted even when rats were re-exposed to cocaine. In a different experiment, drug-naïve rats receiving a dose of isradipine prior to cue-reward training never learned to associate cocaine with a specific room. These results suggest that isradipine might erase established cue-driven memories.

Graduate student Claire Stelly and former postdoctoral fellow Kee-Chan Ahn also contributed to the paper, which was published in the journal Molecular Psychiatry.

These two studies illustrate the promise of testing and repurposing existing FDA-approved drugs to treat addiction craving and relapse. Combining data from human and animal models, Waggoner Center researchers eventually hope to partner with psychiatrists to conduct clinical trials of the most promising agents.

HONORS & AWARDS

Adam Gordon (Marinelli Lab) and Matthew Pomrenze (Messing Lab) received prestigious Graduate Research Fellowships from the National Science Foundation, announced March 31, 2015. The awards are given to early-stage graduate students who demonstrate potential for significant achievements in science and engineering. Out of 16,500 applicants, 2,000 individuals received fellowships, representing a diverse group of scientific disciplines nationwide. The fellowship provides each recipient three years of financial support within a five-year period ($34,000 annual stipend and $12,000 cost-of-education allowance).

Gabrielle Zuniga (Pierce-Shimomura Lab) is a 2015 Dean’s Honored Graduate in the College of Natural Sciences, graduating in May with an Honors Degree in Biology as a member of the Dean’s Scholars and Polymathic Scholars Honors Programs. Honorees represent less than one percent of the college’s graduating class. The dean recognized Zuniga for her outstanding academic record and undergraduate research work in neurogenetics.

The College of Natural Sciences honored Kimberly Raab-Graham with a 2015 Teaching Excellence Award and Jon Pierce-Shimomura with the 2015 Outreach Excellence Award. The 84th Texas Legislature also commended Pierce-Shimomura and The University of Texas Informal Classes for “a program that enriches the lives of adults with intellectual and developmental disabilities.”

Ketan Marballi (Ponomarev Lab) received a Junior Investigator Award to travel to the annual Research Society on Alcohol meeting, held June 20-24, 2015, in San Antonio, TX.

Kelly Jameson (Harris Lab) won a $500 Award for Excellence in Neuroscience Research at the 2015 Undergraduate Research Forum. The event, sponsored by the College of Natural Sciences, hosted 250 participants. Jameson’s prize was one of almost two-dozen awarded.

NEWS

Chancellor William H. McRaven appointed former Provost and Executive Vice President Steven Leslie to serve as executive vice chancellor for academic affairs of The University of Texas System, becoming the System’s chief academic leader. As the System welcomes two new medical schools to academic campuses, the Dell Medical School at UT Austin and the School of Medicine at UT Rio Grande Valley, Leslie will use his prior academic and medical field experience to promote and foster innovative research collaborations.

Paul J. Kenny, professor and chair of pharmacology and systems therapeutics at the Icahn School of Medicine at Mount Sinai, was the featured speaker at the third annual Waggoner Center Advance on March 27, 2015, at the UT Austin alumni center. Kenny studies the neurobiological mechanisms of drug addiction and spoke about the possible role of microRNAs, which regulate gene expression, in mediating vulnerability to cocaine addiction.
PUBLICATIONS


The Waggoner Center for Alcohol and Addiction Research was established in 1999 at The University of Texas at Austin. The center was made possible by a donation from M. June and J. Virgil Waggoner and matching funds from the university. The mission of the center is to create a premier research center for alcohol and addiction research, thereby developing solutions for the prevention and cure of these diseases.

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PUBLICATIONS (continued)


