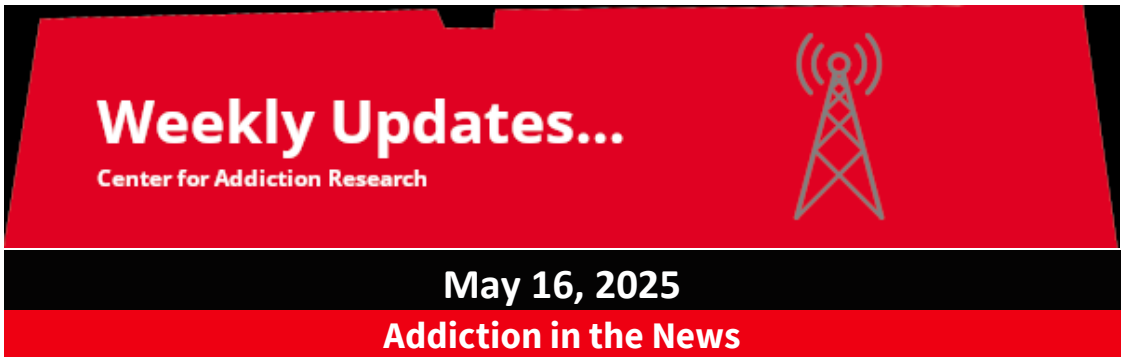
UC CAR Weekly Newsletter 5.16.2025

Welcome to the weekly newsletter from the Center for Addiction Research! Each newsletter includes highlights from addiction in the news topics, active funding opportunities offered by NIDA/NIAAA, and information about any new publications from CAR members. Please email Jen Rowe (roweji@ucmail.uc.edu) to change your communication preferences. Thank you.

Thank you for your interest in the Center for Addiction Research - our mission is to accelerate scientific progress in the prevention and treatment of substance use disorders and their consequences by fostering research collaborations across: 1) UC departments, colleges, and centers including Cincinnati Children's Hospital Medical Center; 2) Local, regional, and state community and governmental partners; and 3) Other academic institutions and industry."



UC/ Regional News

'Slashed and burned': Cincinnati doctors condemn NIH funding cuts

Dr. Judith Feinberg remembers the first time she knew Ohio had a drug problem. Back in 2005, small rural hospitals were sending their patients to the University of Cincinnati Medical Center to get treatment for their infected hearts. They often needed cardiac surgery to survive, along with six weeks of antibiotics administered by an IV. It was the track marks on their arms, said Feinberg, that revealed how these patients had contracted the infections in the first place. "It was not rocket science," she said. Twenty years later, Feinberg says the spread of bloodborne diseases through opioid injection remain a "big problem" – and one that doctors don't always recognize right away. It's the reason why her team of researchers…

Ohio overdose deaths drop 35% last year compared to 2023, per provisional data

OHIO — According to provisional data released by the CDC's National Vital Statistics System Wednesday, Ohio and the nation as a whole saw a significant decrease in predicted drug overdose deaths last year compared to 2023. Nationwide, there were 30,000 fewer U.S. drug overdose deaths in 2024 than the year before — the largest one-year decline ever recorded. An estimated 80,000 people died from overdoses last year, according to the provisional data. That's down 27% from the 110,000 in 2023. The CDC has been collecting comparable data for 45 years. The previous largest one-year drop was 4% in 2018, according to the agency's National Center for Health Statistics. All but two states saw declines last year — with…

White House praised naloxone, then proposed cutting it

Tom Synan, a police chief in Ohio, has seen the damage opioids can do: the dead bodies of people who overdose and the grieving families they leave behind. But he's also seen naloxone, a drug that reverses opioid overdoses, save lives. So he was confused when he learned the Trump administration had proposed cutting programs that make naloxone available to communities and train first responders to administer the antidote. To Synan, who co-chairs a committee of Hamilton County's Addiction Response office, and several other officials and health workers fighting to stem drug deaths, even vague talk of cuts didn't make sense. Naloxone, commonly known by the brand name Narcan, has saved tens of…

Law student graduates at top of class after recovery from addiction, homelessness

Lisa Mertz began using alcohol and marijuana in the eighth grade. By the time the suburban Cincinnati woman started the journey to sobriety in 2015, she'd progressed to painkillers and heroin. Along the way, she lost her job, her home and her kids. Near the end, "I spent every waking moment injecting heroin," she said. On May 9, Mertz, now 42 and president and CEO of Cincinnati's Addiction Services Council, will graduate at the top of her Northern Kentucky University law school class. Key mentors helped her believe she could build a life after addiction. She wants other people battling drug and alcohol use disorders to know they can do the same. She also wants law school classmates to consider her path as they…

The Drug of Choice in Ohio Prisons Is a Legal One

Suboxone is best known for its use treating opioid dependence. Designed to reduce cravings and prevent overdose deaths, Suboxone's tiny, orange strips ease the very difficult process of quitting opioids. But the substance has gained popularity for another use: It has become the drug of choice in Ohio prisons. Composed of buprenorphine and naloxone—a synthetic opioid and an opioid blocker, respectively—Suboxone has been, like many everyday objects, transformed in prison. Outside prison, it is administered as dissolvable strips or films and sublingual pills or tablets. When the strip is dissolved in a water-filled spoon and snorted, the solution produces a stronger psychoactive effect than the strips…

New bill that would ban unlicensed marijuana product sales headed to Ohio House

A bill that would ban unlicensed adult use marijuana is headed to the state House. The bill passed unanimously in the Senate this week. As reported on News Center 7 at 5:30, the bill would make sure consumers are buying a regulated product. "It's not tested properly, it's not regulated. I think it's gone under the radar for a long time," Tracey McMillin of Pure Ohio Wellness said. McMillin says SB 86 is long overdue in Ohio. The bill would ban any intoxicating hemp product that is sold at an unlicensed dispensary. "A child is not going to walk in and buy anything from us,

but my understanding is they can walk into those places and buy something," McMillin said. A doctor from Dayton Children's Hospital spoke to state…

Deaths due to drugs decline in Kentucky

FRANKFORT -- Last week, Gov. Andy Beshear announced that overdose deaths in the commonwealth decreased for the third year in a row, with a 30.2 percent decrease in 2024 compared with the previous year. Among Black Kentucky residents, which had not previously seen a decrease, 170 died from a drug overdose, a decrease from 271 in 2023, marking a 37.3% decrease. According to the 2024 Kentucky Drug Overdose Fatality Report, 1,410 Kentuckians lost their lives last year to a drug overdose. Fentanyl was present in 62.3 percent of overdose deaths, and methamphetamine was present in 50.8 percent of overdose deaths. The two continue to be the most prevalent drugs contributing to overdose deaths in the…

National News

Review: Social drinking also a well-worn path to alcohol use disorder

When picturing a "typical" alcoholic, people tend to imagine a person drinking at home alone. But that focus overlooks the social origins of many serious alcohol problems, say the authors of a new review paper in the journal Current Directions in Psychological Science. "Evidence for the centrality of social motives in problem drinking surrounds us," write the authors, Catharine Fairbairn, a professor of psychology at the University of Illinois Urbana-Champaign, and Dahyeon Kang, of the University of Washington. "While solitary drinking might serve as a useful early indicator of alcohol use disorder risk … research suggests…

Positive mindset linked to fewer problems related to drinking

A person's ability to hold on to positive emotions seems to reduce the risk of problems after drinking, independent of how much alcohol is consumed. A study of college students published in Alcohol: Clinical and Experimental Research has found that there was a stronger link between drinking and problems like blackouts, fights, or driving under the influence in students who had a negative mood before drinking. In students with a positive affect, that link was weaker, and students who had a greater ability to savor enjoyable moments experienced fewer problems regardless of their drinking patterns. The findings suggest…

Could psychedelics help you to drink less alcohol? Our new study aims to find out

Psychedelics like LSD and psilocybin (the active ingredient in magic mushrooms) are gaining increasing attention in psychiatry. Studies suggest they may offer therapeutic benefits for conditions such as depression, anxiety, obsessive–compulsive disorder, eating disorders and addiction. Our research team is investigating whether N,N-dimethyltryptamine (DMT), a fast-acting psychedelic, can help people reduce alcohol consumption. Alcohol is the most commonly

misused substance in the UK, partly because it is legal, widely available and deeply ingrained in social culture. While many people can enjoy alcohol in moderation…

In personalized interventions for risky-drinking college students, more thorough is more effective

Personalized feedback interventions (PFIs), a common strategy for helping college students moderate their alcohol use, can reduce drinking and its negative consequences. But such interventions vary by length and complexity, and targeting them strategically—considering users' level of attentiveness—is an important determinant of outcomes, a new study has found. Drinking attitudes and behaviors among young adults are influenced by their peers. Students are known to overestimate their peers' alcohol use, potentially aspiring to match misperceived levels of consumption. This likely contributes to heavy episodic (binge)…

Alcohol's impairment of women's working memory varies across the menstrual cycle

Alcohol's negative effect on women's working memory is somewhat mitigated when their estrogen levels are higher, a novel study suggests. The findings imply that phases of the menstrual cycle may influence women's vulnerability to the acute effects of alcohol on certain cognitive functions. Working memory is vital for understanding, reasoning, and learning. Studies have shown that drinking impairs working memory, with higher blood alcohol concentrations (BAC) linked to worse performance. Women may experience less alcohol-related working memory impairment than men, though this is unclear, and…

Trajectory of anxiety and depression symptoms during alcohol treatment may predict relapse

Researchers have identified anxiety and depression symptom trajectories that may help explain the high relapse rates for people who quit drinking. A study published in Alcohol: Clinical and Experimental Research has found that almost a third of people in treatment for alcohol-use disorder had symptoms of anxiety or depression, which improved more slowly than is typical—or didn't improve at all. The study suggests that identifying these symptom trajectories early in treatment may provide important clues as to who may benefit from intensive interventions to reduce the risk of relapse. More than half of people treated…

Certain traits in romantic partners can amplify the impact of a person's genetic risk for alcohol problems

A study led by Virginia Commonwealth University and Rutgers University has revealed new insights into how romantic partners can influence a person's genetic predisposition to unhealthy alcohol use. The research team specifically found that the substance use habits, personality traits and mental health status of long-term partners can enhance or diminish the impact of a person's genetic risk for binge drinking. The findings could help reshape strategies for couples therapy and

couple-based alcohol interventions. "This research sheds new light on the complicated and unforeseen ways that spouses and long-term partners…

Do laws requiring vertical IDs for youth curb underage drinking and tobacco use?

All 50 U.S. states and the District of Columbia have adopted vertical identification laws, which require state drivers' licenses issued to individuals under age 21 to be vertically oriented, with the goals of lowering the cost of age verification and curbing underage drinking and smoking. Research published in Contemporary Economic Policy indicates that these laws have not achieved these goals, however. For the study, investigators analyzed 1991–2019 data from the national and state Youth Risk Behavior Surveys. The analysis found no evidence that adoption of vertical identification laws has had a statistically significant or economically…

Evidence review raises concern about cannabis use in pregnancy

An updated systematic review finds that using cannabis while pregnant appears to increase the odds of preterm birth, low birth weight and infant death. The study by researchers at Oregon Health & Science University was published in the journal JAMA Pediatrics. The lead author is a physician-scientist who provides prenatal care for high-risk pregnancies at OHSU. "Patients are coming to me in their prenatal visits saying, 'I quit smoking and drinking, but is it safe to still use cannabis?'" said lead author Jamie Lo, M.D., M.C.R., associate professor of obstetrics and gynecology (maternal-fetal medicine) in the OHSU School of…

Cannabis-related hospital visits rising, often tied to mental health conditions: Study

More people are landing in the hospital with cannabis-related problems—and for many, a mental health condition is the primary issue, according to a new study published in the Journal of Studies on Alcohol and Drugs. The study, conducted in Arizona, found that between 2016 and 2021, cannabis-related hospital visits across the state rose by 20%. Among those visits, one quarter ended up with a primary diagnosis of a mental health condition, including bipolar disorder, depression, and psychotic disorder. That compared with only about 3% of visits unrelated to cannabis. Overall, people with a cannabis-related hospital…

Shifting nicotine product preferences observed in US high school students

University of Southern California and University of Michigan researchers report expanded use of non-tobacco nicotine products among U.S. adolescents. While exclusive e-cigarette use has declined, dual use of nicotine pouches and e-cigarettes has risen. Nicotine use among U.S. adolescents declined during a period of intensified tobacco-related prevention efforts between 1997 and 2013. E-cigarettes reintroduced nicotine to youth by creating a non-tobacco product sector marketed as distinct from combustible tobacco. Marketing strategies framed these products as socially acceptable and less harmful. Nicotine pouches…

Young males, prior cigarette or e-cigarette users most likely to use oral nicotine pouches, research finds

The nicotine industry is constantly innovating, delivering new products to the market—and that keeps public health researchers busy as they work to understand the implications of each new offering. A team from MUSC Hollings Cancer Center has just published a paper in JAMA Network Open describing oral nicotine pouch usage—one of the first papers to look at how common this product is. Hollings researcher Amanda Palmer, Ph.D., a research instructor in the Department of Public Health Sciences, led the study. "These products were introduced just a few years ago, so they're still pretty new, and a lot of the surveys have…

Research shows successful snus cessation leads to increased body weight, blood pressure

The use and marketing of nicotine snus, which does not contain tobacco, is increasing in the UK, the US, Sweden, and other countries. Nicotine is an addictive substance which, among other things, causes blood pressure and heart rate to rise immediately after intake. But it is unclear what happens in the body when snus users stop using snus. Previous research in the field has consisted of observational studies comparing snus users and non-snus users, but from such studies it is not possible to draw conclusions about cause and effect. In the current study, researchers have studied differences that occur in connection with snus…

Lawsuits could choke off the candy-flavored vape pipeline

Most convenience stores feature rows of colorful vapes promising tastes of cotton candy or iced mango, but none of them should be there. The Food and Drug Administration (FDA) has authorized 34 electronic cigarette products. Four menthol vapes are the only flavored products on the list. The fruity-flavored e-cigarettes are all illegal. What's the solution? A new article from representatives of Rutgers Health and New York City advocates a barrage of state and local lawsuits against distributors. "The FDA is trying to regulate cigarettes like pharmaceuticals, and it lacks the resources to make it work," said Kevin Schroth…

US overdose deaths fell 27% last year, the largest one-year decline ever seen

There were 30,000 fewer U.S. drug overdose deaths in 2024 than the year before — the largest one-year decline ever recorded. An estimated 80,000 people died from overdoses last year, according to provisional Centers for Disease Control and Prevention data released Wednesday. That's down 27% from the 110,000 in 2023. The CDC has been collecting comparable data for 45 years. The previous largest one-year drop was 4% in 2018, according to the agency's National Center for Health Statistics. All but two states saw declines last year, with Nevada and South Dakota experiencing small increases. Some of the biggest drops…

Rates of fentanyl nonfatal overdose ED visits rose through third quarter of 2023

From 2020 to 2023, there was an increase in the rates of fentanyl-involved nonfatal overdose emergency department visits, according to research published in the May 8 issue of the U.S. Centers for Disease Control and Prevention Morbidity and Mortality Weekly Report. Cassandra M. Pickens, Ph.D., from the CDC in Atlanta, and colleagues analyzed quarterly trends in rates of suspected nonfatal overdose of unintentional or undetermined intent involving fentanyl or fentanyl analogs overall and by age group, sex, and race and ethnicity. The researchers found an increase in the rates of fentanyl-involved nonfatal overdose emergency department…

Americans' use of illicit opioids is higher than previously reported, survey finds

More Americans use illicit opioids such as fentanyl than previously estimated, highlighting the need for better methods to understand the depths of the opioid crisis, according to a new study. A survey of American adults found that 11% reported illicit opioid use within the past 12 months and 7.5% reported use of illicitly produced fentanyl during the same period, rates that are more than 20 times higher than estimates from a large federal study that annually asks Americans about their use of illicit drugs. Researchers say the findings add to the evidence that government counts may significantly underestimate illicit drug use and…

Study finds critical gaps in Narcan awareness, possession among US adults

As the opioid epidemic continues to plague the United States, Narcan and other treatments that administer naloxone have emerged as effective tools to quickly reverse overdoses and save lives. Yet, a new study by researchers from New Mexico State University and North Dakota State University found significant gaps in naloxone distribution and usage among adults in the United States, adding further complications to the opioid crisis that in 2022 alone claimed the lives of more than 100,000 Americans. The study, published in the American Journal on Addictions, was a collaboration between Jagdish Khubchandani…

Changes Coming To Addiction Treatment Under The Trump Administration

In March 2025, the U.S. Department of Health and Human Services (HHS) announced a large restructuring of several programs that support health, research, and addiction treatment programs. The plan is to consolidate several programs, including the Substance Abuse and Mental Health Services Administration (SAMHSA), into a unified entity under the new Administration for a Healthy America (AHA). Some people in the addiction treatment industry are raising concern about what the consolidation or elimination of SAMHSA could mean for individuals living with an addiction. SAMHSA was created in 1992 to spotlight the need for…

New Opioid Data May Not Reflect Harms Accurately, FDA Advisors Warn

New research about the harms of long-acting opioids may underestimate risks, members of two FDA advisory committees said Monday. Data did not represent

large segments of the U.S. population and relied on varying definitions of misuse and abuse, including a pain-adjusted outcome measure for opioid use disorder (OUD), noted members of the FDA's Anesthetic and Analgesic Drug Products and Drug Safety and Risk Management advisory committees at a joint meeting. "There's a real risk of reporting underestimates of some of these adverse effects and giving the wrong message," said James Floyd, MD, MS, of the University of…

Lifesaving opioid addiction meds are rarely started after emergency visits for overdose

Medications proven to effectively treat opioid addiction are rarely given after emergency department visits for overdose, and who gets them varies, sometimes greatly, depending on race, ethnicity or geography, University of Michigan researchers say. In their study analyzing 100% of Medicaid claims from all 50 states and Washington, D.C., between 2016 and 2020, the researchers found that a mere 6% of patients being treated for overdoses, or about 1 in 16, started treatment with any of the three medications for opioid use disorder, or MOUD, within 30 days of leaving the hospital. "The emergency department offers a critical window of…

Medicaid unwinding linked to disruptions in opioid addiction treatment

The massive national effort to return the Medicaid enrollment process to its pre-pandemic rules starting in April 2023 may have disrupted the care of people receiving treatment for opioid addiction, a new University of Michigan study suggests. The researchers call this finding concerning, because the disruption may increase the risk of overdose or other negative impacts from opioid use disorder in states that were most aggressive in removing people from Medicaid coverage during the "unwinding" process in 2023. The study has implications for the current debate over the future of Medicaid funding, which may…

Nearly quarter of people on long-acting opioids develop addiction, study reveals

More than one in five people prescribed extended-release painkillers such as OxyContin developed an addiction within a year, according to a newly released study mandated by the U.S. Food and Drug Administration. The study, repeatedly delayed by more than a decade and released on May 5th, revealed a far higher percentage of pain patients addicted to opioids than drugmakers' sales reps claimed in their marketing materials and representations to physicians. The FDA now faces the question of how to use this data to evaluate whether the agency should make changes to opioid regulation, limiting broad…

Animal sedative medetomidine is showing up in the US illegal drug supply, CDC says

The animal sedative medetomidine is increasingly showing up in the U.S. illegal drug supply, according to three reports released Thursday. Medetomidine, which is used to sedate pets and is somewhat similar to xylazine, was first detected in

illegally manufactured opioids in North America in 2022. Investigators say the drug is being mixed in with other illicit drugs, mainly fentanyl, the synthetic opioid behind most overdose deaths. On Thursday, the Centers for Disease Control and Prevention published three reports about recent clusters of medetomidine cases in Chicago, Philadelphia and Pittsburgh. In Chicago, health officials…

Famous film helps reveal brain region biased towards drug cues in individuals with heroin use disorder

Mount Sinai researchers have found that a brain region that is implicated extensively in value-based decision-making and craving in people with heroin use disorder—known as the orbitofrontal cortex (OFC)—shows synchronized responses biased toward drug content, outcompeting other typical subjects of attention and motivation, in a group of individuals with heroin use disorder who watched "Trainspotting," the Academy Award-nominated 1996 movie about people who use heroin in Scotland. Importantly, the research team also found that the OFC's bias toward drug stimuli was significantly reduced in people who underwent…

Ventricular Arrhythmias More Likely to Strike Users of Meth, Cocaine

Users of illicit stimulants were at elevated risk of ventricular arrhythmia (VA) and mortality, according to a longitudinal cohort study from California. A record of methamphetamine use was associated with increased incident VA (adjusted HR 1.90, 95% CI 1.85-1.95) and mortality (adjusted HR 1.51, 95% CI 1.47-1.54) over nearly 10-year follow-up. Cocaine use was similarly tied to VA (adjusted HR 1.15, 95% CI 1.10-1.19) and mortality (adjusted HR 1.68, 95% CI 1.64-1.72) in analyses by Gregory Marcus, MD, MAS, of the University of California San Francisco, and colleagues. "It is worth emphasizing that these stimulants, especially…

Winning experiences can reduce drug-seeking behavior by reshaping brain's dopamine system

Drug addiction poses a global public health challenge, with limited therapeutic options and modest efficacy. While clinical observations suggest that social rank plays a crucial role in determining susceptibility to addiction, its neural mechanisms remain unclear. In a study published in Nature Neuroscience, a research team led by Prof. Zhu Yingjie from the Shenzhen Institutes of Advanced Technology (SIAT) of the Chinese Academy of Sciences has revealed the neural mechanism underlying the role of social rank in addiction vulnerability. Using advanced techniques including fiber photometry, fast-scan cyclic voltammetry…

A quarter of children have a parent with substance use disorder, a study finds

Nearly 19 million children in the United States have at least one parent with a substance use disorder, according to a new study published Monday in JAMA Pediatrics. And a significant number of those children have a parent whose addiction is moderate or severe as opposed to mild, the study finds. The number amounts to 1 in 4 children with a parent who has addiction. "I'm an addiction doc,

and so I think about this issue all the time," says Dr. Scott Hadland, chief of adolescent medicine at Massachusetts General Hospital, who wasn't involved in the new study. "Even still, I was surprised at how high that percentage was. It's just…

Experts warn Congress cuts to addiction funding will mean more overdose deaths

A coalition of addiction experts said more than 300 physicians, harm reduction workers and researchers signed a letter delivered to Congress late on Monday warning of "dire consequences" if the U.S. cuts funding for programs that help communities battle the drug overdose epidemic. "[W]e are seeing drastic cuts to key agencies," the letter said, pointing to proposals in the White House budget for 2026 that would slash billions of dollars from the Centers for Disease Control and Prevention, the Substance Abuse and Mental Health Services Administration, and other programs. The letter, sent to Democratic and Republican leaders…

Inclusive peer support groups are expanding at US colleges, but stable funding is needed

A new study has found that collegiate recovery programs with multiple sources of funding serve twice as many students as programs with only one source of funding. These programs, particularly those that offer support groups for students in all stages and types of recovery, can serve as a lifeline during the challenging college experience. As colleges and universities continue to prioritize student mental health and well-being, collegiate recovery programs (CRPs) are emerging as a vital component of these efforts for students recovering from substance-use disorders and behavioral addictions. The study, led by a Boston…

Nitrous oxide recreational use is linked to brain damage and sudden death—but it's still sold all over the U.S.

The U.S. Food and Drug Administration is warning Americans about the ever-increasing and potentially deadly recreational use of nitrous oxide products, particularly among young people. Marketed with names like "Galaxy Gas" and "Miami Magic," and often sold in steel cartridges known as "whippets," these products are cheap and readily available at gas stations, convenience stores, smoke shops and major retail outlets, including Walmart. They're also sold online. As an assistant professor of public health who studies these products, I'm aware of how dangerous they can be. Recreational and continued use of…

Funding Opportunities

NOT-DA-24-062
Notice of Change to PAR-23-021, "Avenir Award Program for Genetic or Epigenetic of Substance Use Disorders (DP1 Clinical Trial Optional)"

UC Foundation Funding Opportunity
Please contact Carol Russell at (513) 556-6169 or **russecg@foundation.uc.edu** **at least 5 business days before the deadline,** prior to applying to the below opportunity, to ensure coordination and to facilitate assistance with approaches.

American Psychological Foundation Takes Applications for Dr. Joseph B. Gittler Award

Deadline: June 5, 2025
The American Psychological Foundation invites applications for its Joseph B. Gittler Award. Established through a bequest from Joseph Gittler, PhD, the award recognizes psychologists who have made and continue to make scholarly contributions to the philosophical foundations of psychological knowledge. An award of $4,500 will be given to an individual who has made a significant contribution to the philosophical foundations of psychology, particularly over the last five to 10 years. Psychologists at any stage of their careers will be considered. Applicants must be a psychologist with an EdD, PsyD, or PhD from an accredited university.

Other Funding Opportunity…

Harrington Discovery Institute Opens Call for 2026 Harrington Scholar-Innovator Award

Deadline: Letter of Intent, June 4, 2025
Unique program for physician-scientists to advance promising discoveries into medicines. Harrington Discovery Institute at University Hospitals is now accepting Letters of Intent for the 2026 Harrington Scholar-Innovator Award for physician-scientists. The award offers successful applicants multiple opportunities for funding in addition to expertise from pharma-experienced leaders with a track record of bringing drugs to market. Intellectual property rights are retained by the award recipient and/or their institution. Up to 12 Scholar-Innovators will be selected to receive: $100,000 guaranteed grant award; Drug and business development support from Harrington's Therapeutics Development Center advisors; Opportunity to compete for acceleration funds up to $300,000; Opportunity to qualify for investment funds typically up to $2M. The call is open to physician-scientists at

accredited academic medical centers, research institutions and universities in the United States and Canada. Applicants must have a doctorate in medicine. Selection criteria include innovation, creativity and the potential for clinical impact. Award recipients will be selected by Harrington Discovery Institute's Scientific Advisory Board and announced in April 2026.

CAR Member New Publications

Prefrontal cortical microglial transcriptome relates to mouse offspring executive function deficits after perinatal opioid exposure in a sex-dependent manner

Brittany L. Smith, Brandon Brooks-Patton, Justin L. Bollinger, Tess A. Guzman, Alexander H. Brendle, Samuel C. Woodburn, Anna G. Makela, Eric S. Wohleb, Teresa M. Reyes

Brain, Behavior, and Immunity
DOI: https://doi.org/10.1016/j.bbi.2025.03.016

ABSTRACT

Opioid use during pregnancy affects over 7% of pregnancies in the United States. While efforts have been directed at mitigating effects of prenatal opioid exposure acutely in the neonatal period, long-term neurodevelopmental studies in humans remain challenging. Using a preclinical model, we previously found that perinatal morphine (MO) exposure induces sex-dependent executive function deficits in adult offspring, and sexually divergent shifts in microglia phenotype. Therefore, this study used transcriptional profiling to test whether perinatal MO exposure would cause sex-specific transcriptional changes in microglia that would relate to offspring executive function outcomes in BXD F1 mice. Female C57BL/6 mice were given MO via the drinking water or saccharin only (SCH) one week prior to mating with DBA males, throughout gestation, and lactation until offspring were weaned. Offspring executive function was assessed in adulthood using the 5-choice serial reaction time task (5CSRTT), and microglia from the PFC were isolated and characterized via RNA-seq. In the 5CSRTT, male MO-exposed offspring had reduced accuracy and female MO-exposed offspring had increased inattentive behavior. There were a similar number of genes altered in female vs. male microglia, but only 3 differentially expressed genes were evident in both sexes. Further, hierarchical clustering analysis and WGCNA identified genes that related to behavioral deficits. Together, our data identify individual genes and pathways in microglia within each sex that may relate to executive function deficits observed after perinatal opioid exposure, even though the transcriptional profiles are highly divergent between the sexes.

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