2009 NIDA International Forum

June 19–23 • Reno, Nevada

Commonalities among the diseases of addiction: implications for treatment and prevention.

NIDA and Fogarty International Center Poster Presentations

NIDA International Program
National Institute on Drug Abuse
National Institutes of Health
U.S. Department of Health and Human Services

AIDS RESEARCH PROGRAM (ARP)

Mission Statement

Support the development, planning, and coordination of HIV/AIDS priority research within NIDA's intramural and extramural programs, as well as with other NIH Institutes and U.S. Department of Health and Human Services agencies, to achieve an integrated vision and strategy to guide HIV/AIDS research throughout NIDA.

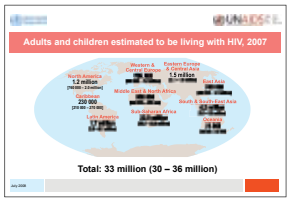
NIDA NATIONAL INSTITUTE ON DRUG ABUSE

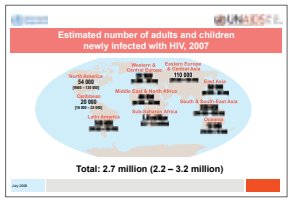
Goals

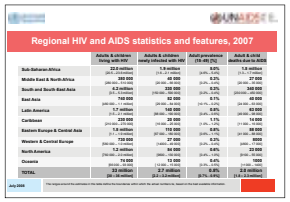
ARP provides direction and leadership for the development of an innovative and multidisciplinary HIV/AIDS research portfolio that addresses the unique dimensions of drug use and abuse as they relate to HIV/AIDS. The development and implementation of NIDA's HIV/AIDS research program is guided by the role of drug use and its related behaviors in the evolving dynamics of HIV/AIDS epidemiology, natural history/pathogenesis, treatment, and prevention, in coordination with the current priorities and objectives of the NIH Office of AIDS Research strategic plan for HIV/AIDS research.

International Funding Priorities

- Development of new methods for gathering HIV epidemiological data and tracking HIV diffusion
- Development of prevention strategies addressing HIV and other injection drug use epidemics in different geographic areas (e.g., Russia, China, Southeast Asia, India, Eastern and Central Europe)
- Development of regional research networks
- Assessment of role of immigration and migration in HIV transmission
- Assessment of drug treatment as HIV prevention, including development of long-acting, sustainable therapies
- Development of prevention strategies addressing non-injection drug use, such as stimulants (e.g., methamphetamine, cocaine, crack) in vulnerable populations (e.g., MSM, young women) where prevalence of HIV infection is high (e.g., Latin America)
- Assessment of HIV/AIDS treatment as prevention
- Assessment of HIV and co-infections (e.g., HCV, TB)

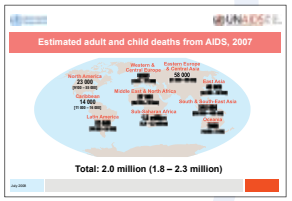






	Adults & children living with HIV	Adults & children newly infected with HIV	Adult prevalence (15-49) (%)	Adult & child deaths due to AIDS
Sub-Saharan Africa	22.0 million [20.5 – 23.5 million]	1.9 million [1.6 – 2.1 million]	5.0% [4.8% – 5.2%]	1.6 million [1.3 – 1.7 million]
Middle East & North Africa	380 000 [260 000 – 510 000]	40 000 [24 000 – 67 000]	0.3% [0.2% – 0.4%]	27 000 [24 000 – 30 000]
South and South-East Asia	4.2 million [3.9 – 5.0 million]	330 000 [190 000 – 560 000]	0.3% [0.2% – 0.4%]	340 000 [250 000 – 460 000]
East Asia	770 000 [470 000 – 1 100 000]	75 000 [29 000 – 140 000]	0.1% [0.1% – 0.2%]	45 000 [24 000 – 83 000]
Latin America	1.7 million [1.5 – 2.1 million]	140 000 [90 000 – 190 000]	0.5% [0.4% – 0.6%]	63 000 [45 000 – 85 000]
Caribbean	230 000 [200 000 – 310 000]	20 000 [14 000 – 28 000]	1.1% [1.0% – 1.3%]	14 000 [11 000 – 18 000]
Eastern Europe & Central Asia	1.6 million [1.1 – 2.2 million]	110 000 [37 000 – 180 000]	0.8% [0.5% – 1.1%]	58 000 [21 000 – 90 000]
Western & Central Europe	720 000 [590 000 – 1 100 000]	30 000 [18 000 – 49 000]	0.3% [0.2% – 0.4%]	2 000 [1 000 – 1 100]
North America	1.2 million [750 000 – 1 900 000]	50 000 [28 000 – 85 000]	0.6% [0.4% – 0.9%]	22 000 [12 000 – 36 000]
Oceania	74 000 [53 000 – 94 000]	12 000 [7 100 – 18 000]	0.4% [0.3% – 0.6%]	1000 [< 500 – 1 600]
TOTAL	33 million [30 – 36 million]	2.7 million [2.2 – 3.2 million]	0.8% [0.7% – 0.9%]	2.0 million [1.8 – 2.3 million]

July 2008 | The religious and ethnic classifications in this table reflect the United Nations' official classification, which differs from that used in the UNAIDS report. Adapted from the Global Epidemiology, UNAIDS, 2008.



International Focus

AIDS knows no borders; it is an international and a U.S. public health threat. HIV/AIDS has become a pandemic—worldwide, more than 25 million people have already died. More than 30 million people are estimated to be living with HIV/AIDS. While AIDS is a global phenomenon, the nature of the epidemic varies geographically, and risk factors vary within and across populations. NIDA supports international research to elucidate the pivotal role of drug use and abuse in the transmission and progression of HIV/AIDS and to evaluate preventive interventions, such as drug abuse treatment.

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drugabuse.gov/about/organization/arp

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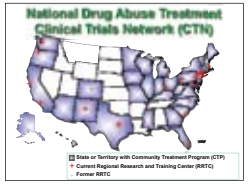
CENTER FOR THE CLINICAL TRIALS NETWORK (CTN)

Mission Statement Improve the quality of drug abuse treatment through a unique partnership among NIDA, community treatment providers, and academic research leaders who cooperatively develop, validate, refine, and deliver new treatment options to patients in community-level clinical practice.

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

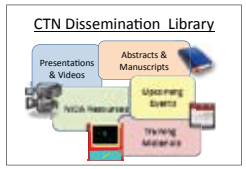
Research Objectives



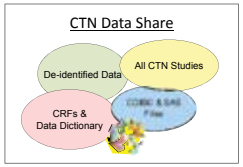
Through the CTN, treatment researchers and community-based service providers conduct studies of behavioral, pharmacological, and integrated behavioral and pharmacological treatment interventions in rigorous, multisite clinical trials to determine effectiveness across a broad range of community-based treatment settings and diversified patient populations. The CTN framework ensures that these research results are transferred to providers and patients.

Research Dissemination

The **CTN Dissemination Library (ctndisseminationlibrary.org)** is a digital repository of free resources that provides CTN members and the public with a single point of access to research findings, training manuals, presentations, and other materials.



The **CTN Data Share (ctndatashare.org)** is a free electronic environment that promotes new research and encourages further analyses by distributing data from completed clinical trials to registered investigators. Data on this site have been completely de-identified to protect the privacy of individual research participants. Users must complete a registration agreement prior to downloading any study data.



INVEST/CTN Drug Abuse Research Fellowship

- Non-U.S. scientists receive 1 year of postdoctoral research training.
- Work with a mentor affiliated with a CTN Regional Research and Training Center.
- Conduct research in any aspect of the CTN research agenda while preparing for longer-term collaboration.
- Main eligibility criteria include:
  - An earned doctoral degree in medicine, public health, or biomedical, behavioral, or social sciences
  - Minimum 2 years of postdoctoral research experience
  - Proficiency in written and spoken English
  - Eligibility for the J-1 visa to enter the United States

Application Deadline: September 1

Learn more at **international.drugabuse.gov/research/fellowships_investCTN.html.**

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DIVISION OF BASIC NEUROSCIENCE AND BEHAVIORAL RESEARCH (DBNBR)

Mission Statement

Support basic research on the causes and consequences of drug abuse and addiction, thus providing the scientific foundation for the development and enhancement of prevention efforts and treatment approaches to drug abuse and addiction.

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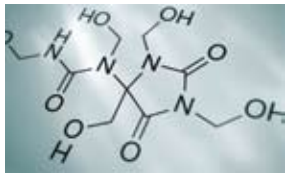
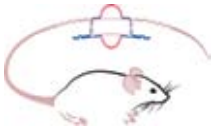
Research Focus

DBNBR develops and supports human and animal research that investigates the neurobiological and behavioral effects of drugs of abuse; genetic vulnerability to addiction; regulation of the mechanisms of neurotransmission under normal, drug-exposed, and drug-withdrawn conditions; multidisciplinary analyses at the levels of the single cell, protein, or circuit; chemistry and physiological systems affected by drugs of abuse; and the complex interrelationship between drug abuse and HIV/AIDS progression and transmission. DBNBR also supports research training for biomedical and behavioral investigators.





The goal of KOMP (the Knock Out Mouse Project) is to knock out 8,000 genes in C57BL/6N ES cells. This is part of an international effort to knock out every gene in the mouse genome. The ES cells carrying the knock out are used to create mutant mice lacking that particular gene.

Organization

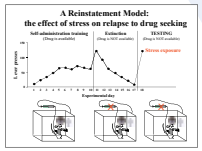
The division has four components:

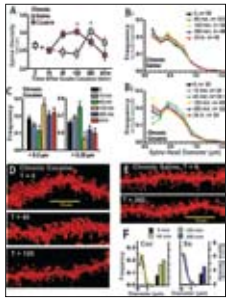
- Behavioral and Cognitive Science Research Branch
- Chemistry and Physiological Systems Research Branch
- Functional Neuroscience Research Branch
- Genetics and Molecular Neurobiology Research Branch

DBNBR administers the NIDA Drug Supply Program, which provides researchers with chemicals and research probes that are either unavailable, difficult to obtain, or expensive. The program also analyzes researchers' experimental samples.

Research Priorities

- Models of addiction
- Drug-induced neuroadaptation and neuropathology in brain systems
- Pain and analgesia
- Cognitive processes
- Vulnerability to drug abuse
- Developmental effects
- Neuropsychopharmacology of drugs of abuse
- Genetic basis of vulnerability to drug addiction
- Neuroimmune relationships, including studies of HIV and AIDS related to neural or infectivity processes
- Innovative chemical design of new entities and probes
- Development of innovative analytical methods





Acute cocaine administration (30 mg/kg, i.p.) reveals plasticity in dendritic spines after withdrawal from daily cocaine.
Shen, H.-w. et al. J. Neurosci. 2009;29:2876-2884

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drugabuse.gov/about/organization/DBNBR

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DIVISION OF CLINICAL NEUROSCIENCE AND BEHAVIORAL RESEARCH (DCNBR)

Mission Statement

Provide a translational approach to drug abuse within a clinical research context to advance our understanding of the brain, behavior, and health.

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

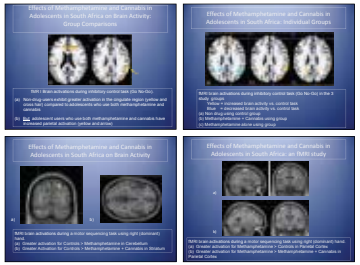
Goals

DCNBR conceptualizes drug abuse as a human developmental neurobiological disorder and promotes high-caliber research to identify the key developmental, genetic, social, and brain mechanisms associated with drug abuse, and to translate resultant findings into therapeutic interventions that decrease the extent and burden of drug abuse. DCNBR actively fosters collaboration and translation across its three branches:

- Behavioral and Brain Development Branch (BBDB)
- Clinical Neuroscience Branch (CNB)
- Behavioral and Integrative Treatment Branch (BITB)

International Research Projects

BBDB supports research on prenatal exposure to drugs of abuse in Canada, New Zealand, England, and South Korea. The branch also supports research on HIV/AIDS and maternal drug and alcohol use in South Africa. CNB supports research on cognitive dysfunction in Bulgaria and Russia and brain imaging training for researchers from China, South Korea, Ireland, and South Africa. BITB supports research on integrated behavioral and pharmacological treatment in Ukraine; primary care drug screening in the Czech Republic; treatment provider training in South Africa; adaptation of cognitive-behavioral therapy in Trinidad and Tobago; the community reinforcement approach plus vouchers in Spain; and buprenorphine maintenance treatment in Malaysia.



Carey P., Suliman S., Ferrett H., Burnett Michael, Silveri M., Gruber S., Olson D., Yurgelun-Todd D., Brain Changes with Cannabis and Methamphetamine in Adolescents, submitted. Supported by R21DA023422 for collaboration between McLean Hospital, Massachusetts (D. Yurgelun-Todd, P.I.) and University of Stellenbosch, South Africa (P. Carey, P.I.).

International Funding Priorities

- Health and development of drug- and HIV/AIDS-exposed children and youth
- Training for non-U.S. investigators in state-of-the-art methods in clinical and cognitive neuroscience
- Research targeting unique populations or expertise not available in the United States to advance understanding of the clinical neuroscience and behavior of drug addiction
- Research using unique technologies, populations, or expertise not available in the United States to develop and/or test behavioral and/or HIV risk reduction interventions
- Studies focused on improving adherence to HIV treatment among different cultures or populations
- Studies to disseminate behavioral interventions internationally via distance learning, new technologies, or other methodological paradigms

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DIVISION OF EPIDEMIOLOGY, SERVICES AND PREVENTION RESEARCH (DESPR)

Mission Statement

Promote epidemiology, services, and prevention research to understand and address the range of problems related to drug abuse to improve public health. DESPR's vision is to support extraordinary public health research to end drug abuse.

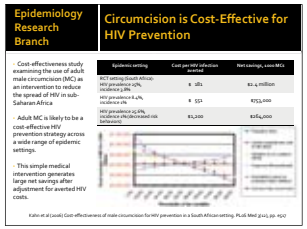
NIDA NATIONAL INSTITUTE ON DRUG ABUSE

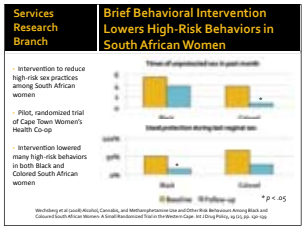
Major Research Themes

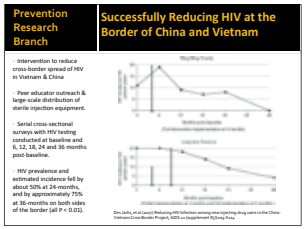
- Theories – What new theoretical approaches can inform our research?
- Interactions – What intrapersonal and environmental factors interact with each other and with genetic factors across development?
- Blending – How can we blend science and services to measurably affect public health outcomes?

International Funding Priorities

- Understand the etiology and epidemiology of drug abuse and co-occurring behavioral, psychiatric, social, and medical problems.
- Improve the quality of care through research on financing, technology, and workforce.
- Develop and maximize use of high-quality preventive interventions in real-world settings through research on individual factors, environmental strategies, community-based participation, and the relationship of drug abuse prevention to HIV prevention.
- Develop and improve the quality and reach of prevention and treatment services for drug abuse.







International Focus

DESPR supports a variety of drug abuse research projects around the world. The division's international research portfolio includes studies in Russia, Lithuania, Ukraine, Hungary, Bulgaria, Norway, China, India, Vietnam, Thailand, Burma, Laos, Tanzania, South Africa, Uganda, Malawi, Argentina, Brazil, Chile, Nicaragua, Costa Rica, Peru, Canada, and along the U.S.-Mexico border. In addition, through NIDA's National Hispanic Science Network, DESPR is facilitating the establishment of a Latin American epidemiology network on drug abuse. DESPR also collaborates with the Fogarty International Center to reach promising international scientists.

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drugabuse.gov/about/organization/DESPR

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DIVISION OF PHARMACOTHERAPIES AND MEDICAL CONSEQUENCES OF DRUG ABUSE (DPMCDA)

Mission Statement Use science as a vehicle for improving the management of drug addiction and its medical consequences, including HIV, with an emphasis on the identification, evaluation, and development of new pharmacological and immunological treatment agents.

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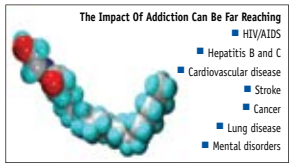
Goals

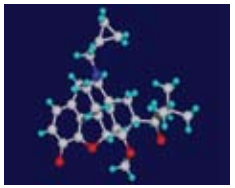
DPMCDA is a congressionally mandated medications development program tasked with everything from synthesizing and screening potential drug entities to submitting applications to the U.S. Food and Drug Administration (FDA) for its approval of pharmacotherapies that are safe and effective treatments for drug addiction. The division supports research through grants, contracts, and interagency agreements for preclinical investigations, Phase I clinical pharmacology studies, and Phase II and Phase III multicenter clinical trials. DPMCDA also supports research on the medical consequences of drugs of abuse and co-occurring viral and bacterial infections.



Cannabis and Opioids

Cannabis addiction, particularly among adolescents, is a public health priority. Recent research findings facilitating the development of medications include:

- An endogenous cannabinoid system with specific receptors and ligands
- Reliable preclinical models to study the rewarding and addiction-producing effects of THC
- New chemical entities or new uses of marketed medications



NIDA has obtained FDA approval for three medications to treat opioid addiction: LAAM, buprenorphine, and buprenorphine/naloxone. DPMCDA hopes to add more pharmacotherapies and evaluate marketed medications for use in special populations such as children, adolescents, and pregnant women.

Cocaine and Methamphetamine

DPMCDA has supported the clinical evaluation of more than 68 pharmacotherapies to treat cocaine dependence, and cocaine remains the division's priority. Methamphetamine addiction is a public health priority and is second only to cocaine in DPMCDA funding. FDA has not yet approved a medication to treat either disorder, and DPMCDA is researching compounds that interact with these targets:

- D1 receptor agonists
- GABA-mimetics
- D3 receptor agonists and antagonists
- Glutamate modulators
- CRF-1 antagonists
- CB-1 antagonists
- Orexin receptor antagonists
- VMAT-2 inhibitors (methamphetamine)
- Muscarinic M5 agonists and antagonists

Contact Us

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JOHN E. FOGARTY INTERNATIONAL CENTER

FOR ADVANCED STUDY IN THE HEALTH SCIENCES

Mission Statement

Dedicated to advancing the mission of the National Institutes of Health (NIH) by supporting and facilitating global health research conducted by U.S. and international investigators, building partnerships between health research institutions in the United States and abroad, and training the next generation of scientists to address global health needs.

FOGARTY

Goals

Fogarty serves as a bridge between NIH and the greater global health community—facilitating exchanges among investigators, providing training opportunities, and underwriting promising research initiatives in low- and middle-income countries. Fogarty's "Strategic Plan: 2008–2012" adopted five goals:

- Address the growing epidemic of chronic, noncommunicable diseases.
- Bridge the implementation research training gap.
- Develop human capital in the developing world.
- Foster a sustainable research environment in low- and middle-income countries.
- Build strategic alliances and funding partnerships.

Training Researchers Around the World

The Fogarty Division of International Training and Research administers research grants, training grants, and fellowship programs at sites in more than 100 countries. Fogarty programs that build the research pipeline are anchored to peer-reviewed research grants and designed to be collaborative, long term, and flexible. Nearly one-quarter of Fogarty awards are made directly to robust research institutions in the developing world. The remaining grants support scientists at U.S. institutions who collaborate with colleagues abroad. About one-third of Fogarty's grants focus on scientific discovery, and two-thirds support research training.

Fogarty – NIDA Grants

Copyright: Curt Carnemark/World Bank

NIDA participates in the following Fogarty programs:

Research Grants

- Global Health Research Initiative Program (GRIP)—Behavioral/Social Sciences R01: PAR-07-328; and Basic/Biomedical Sciences R01: PAR-07-329
- Brain Disorders in the Developing World (BRAIN)—R01: PAR-08-112; and R21: PAR-08-113
- Fogarty International Research Collaboration Award (FIRCA)—Behavioral/Social Sciences (FIRCA-BSS) R03: PAR-08-223; and Basic/Biomedical (FIRCA-BB) R03: PAR-08-222
- Collaborative HIV/AIDS Studies in the Middle East and North Africa—R21: PAR-08-153

Research Training Grants

- AIDS International Training and Research Program (AITRP) Awards—PAR-07-348
- International Clinical, Operational, and Health Services Research Training Award for AIDS and TB (ICOHRTA AIDS/TB)—PAR-08-155

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NIDA INTERNATIONAL PROGRAM

Mission Statement

Address the global impact of addiction on public health by:

- Taking advantage of unique opportunities to advance scientific knowledge through research.
- Building research capacity internationally.
- Sharing NIDA-supported research findings with scientists, treatment providers, and policymakers.

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Support Research

NIDA's scientific priority areas include linkages between HIV/AIDS and drug abuse, adolescent and prenatal tobacco exposure, methamphetamine, inhalants, and drugged driving. International investigators propose research projects by applying for direct foreign grants or domestic grants with a foreign component and by responding to Program Announcements (PAs) and Requests for Applications (RFAs). Letters of Intent for the new RFA, International Research Collaborations on HIV/AIDS and Drug Use (R01: RFA-DA-10-008) are due October 18, 2009. The International Research Collaboration on Drug Abuse and Addiction Research PAs use three mechanisms to support awards of different amounts: R01: PA-09-020, R21: PA-09-021, R03: PA-09-022.

Build Research Capacity

NIDA International Program fellowships provide research training and professional development opportunities for scientists at every stage of their careers:

- INVEST Drug Abuse Research Fellowships – Postdoctoral training with a NIDA-funded scientist
- INVEST/Clinical Trials Network (CTN) Drug Abuse Research Fellowships – Postdoctoral training with a NIDA CTN scientist
- NIDA Hubert H. Humphrey Drug Abuse Research Fellowships – Academic study and research experience for mid-career professionals from low- and middle-income countries
- DISCA/USDISCA – Distinguished International Scientist Collaboration Awards for senior scientists and their research partners

Find NIDA fellowship alumni with the International Program Fellowship Map and link from individual fellows to their journal articles indexed in PubMed at **international.drugabuse.gov/research/fellowships_worldwide_map.html.**

Share Resources Online

The NIDA International Program Web resources offer robust communications, research collaboration, and training tools, while centralizing access to resources such as databases and funding sources. Collaboration and training tools include:

- NIDA International Virtual Collaboratory **nivc.perpich.com**
- International Drug, Alcohol, and Tobacco (IDAT) Research Community **www.idatresearch.com**
- Methadone Maintenance Research Web Guide **international.drugabuse.gov/methadone**
- International Programme in Addiction Studies Master's Degree **adelaide.edu.au/addiction**
- Drug Abuse Research Training Modules **drugabuseresearchtraining.org**
- Publishing Addiction Research Internationally, developed by the International Society of Addiction Journal Editors **www.parint.org**

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INTRAMURAL RESEARCH PROGRAM (IRP)

International Interests

Promote international collaborative research that facilitates the elucidation of brain mechanisms underlying drug addiction and relapse, chronic pain, and the development of new treatment modalities. IRP also provides pre- and postdoctoral training for foreign investigators and collaborative research experience for senior foreign investigators in state-of-the-art techniques at the molecular, neurobiological, preclinical, and clinical levels.

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IRP branches seek the following from international partners:

Behavioral Neuroscience Research Branch

- Highly potent and selective receptor agonists, partial agonists, and antagonists for receptor subtypes thought to affect addictive processes
- New approaches to assess interactions between neurotransmitter-neuromodulator systems, receptors, and heteromeric receptor complexes
- New cannabinoid compounds that selectively modulate the actions of endogenous cannabinoid systems, with potential beneficial effects for the treatment of psychiatric disorders or drug dependence

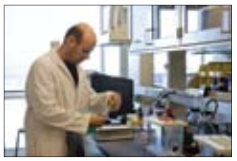
Molecular Neuropsychiatry Research Branch

- Well-characterized samples from drug-dependent individuals and matched-control individuals

Chemical Biology Research Branch

- Collaborations on *in vivo* or *in vitro* studies of novel opioids, CRH receptor antagonists, and agonists or antagonists that are involved in drug abuse

Clinical Pharmacology and Therapeutics Research Branch



- Collaborators able to translate questionnaires into their native language and administer them to samples of drug users of various ages from a variety of locations
- Reports of experiences with withdrawal and coping techniques
- Controlled drug administration studies in humans
- *In utero* drug exposure of licit pharmacotherapies and illicit drugs
- Biological monitoring in treatment studies
- Studies of driving under the influence, workplace drug testing, and anti-doping
- Alternative routes of cannabinoid agonist delivery
- Cannabinoid antagonist administration studies

Cellular Neurobiology Research Branch

- Tissue lipid profiling
- Generation of transgenic mice
- Sigma-1 receptor function
- *In vitro* cellular models for testing drug effects
- Differentiated human neurons from embryonic stem cells
- Single cell electrophysiology using slice and *in vitro* preparations

Medications Discovery Research Branch

- Selective receptor agonists, partial agonists, and antagonists with affinity for targets involved in drug abuse
- Collaborative opportunities to use these novel tools in models of drug abuse that will contribute to the understanding of the molecular basis of cocaine addiction and provide new strategies for drug design

Molecular Neurobiology Research Branch

- Well-characterized samples from substance-dependent individuals who are successful versus unsuccessful in quitting
- Well-characterized substance-dependent and matched-control individuals
- Well-characterized samples from individuals with individual differences in regional brain volumes and/or activation patterns and mnemonic systems
- Collaborations in characterizing knockout mice with related phenotypes

Neuroimaging Research Branch

- Develop and apply novel cognitive task probes to better understand the neurobiology of human drug abuse
- Collaboration on novel MRI and fMRI pulse sequence developments and data analysis strategies
- Application of preclinical animal models to novel systems-level imaging investigations of drug dependence
- New MR-contrast agents to reveal cellular and molecular information about the brain

Contact Us

drugabuse.gov/DIR
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SPECIAL POPULATIONS OFFICE (SPO)

Mission Statement

Coordinate NIDA's health disparities research, concentrating especially on areas where there are significant gaps in knowledge or clear disparities in prevention and treatment. Promote research on drug abuse in minority populations and the participation of underrepresented scientists in drug abuse research.

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Programs

SPO conducts limited international activities, working primarily through the following efforts:

- Research Supplements to Promote Diversity in Health-Related Research ("Diversity Supplements")
- Special Populations Research Development Seminar Series
- Grant writing and development assistance
- Diversity-Promoting Institutions Drug Abuse Research Program
- Intramural Research Program Minority Recruitment and Training Program
- Summer Research with NIDA
- Historically Black Colleges and Universities Initiative
- Health Disparities Committee
- African American Initiative Committee
- Researchers and scholars expert work groups

National Hispanic Science Network (NHSN)

SPO helped launch NHSN and serves as the primary NIDA liaison to the group, which is dedicated to improving the health of Hispanics by increasing the amount and quality of interdisciplinary translational research on drug abuse and fostering the development of Hispanic scientists in drug abuse research. The International Research Collaboration Subcommittee works to include international scientists, students, and perspectives in NHSN conferences and the Summer Research Training Institute for students and new investigators. The International Subcommittee participates in REDLA (RED Latino Americana de Investigadores en Drogas), whose mission is to advance drug epidemiology and other research while addressing specific needs in Latin America.

NATIONAL HISPANIC SCIENCE NETWORK ON DRUG ABUSE

Latin America Initiative

SPO works closely with the International Program to assist NIDA to help identify other Federal partners working in Latin America and to coordinate activities between NHSN and the Latin America Initiative. Through the initiative, NIDA works to stimulate the creation of regional networks to enhance surveillance and research conducted in Latin American countries. To build research capacity in the region, training programs focus on secondary data analysis and clinical trials management.

Contact Us

drugabuse.gov/about/organization/spo/spohome.html

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WOMEN AND SEX/GENDER DIFFERENCES RESEARCH PROGRAM

Mission Statement

Promote the conduct and dissemination of research on women's health and sex/gender differences in all areas of drug abuse research.

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History

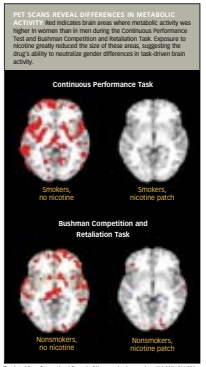
In the past, public health research subjects were almost exclusively male, and as a result, little data were available on women. For well over a decade, however, NIDA has been actively promoting drug abuse research focusing not only on the study of women, but also on sex/gender differences, as this approach permits identification of outcomes that vary by sex/gender. All of NIDA's programmatic branches now support research on women and sex/gender differences.

Research Interests

Male-female differences likely exist in many aspects of drug abuse that are yet to be identified. Future research will improve our understanding of the mechanisms and etiology of drug abuse and addiction and how to tailor prevention and treatment interventions that maximize outcomes for both males and females. To encourage this research, NIDA and the National Institute on Alcohol Abuse and Alcoholism have issued three Program Announcements calling for grant applications on Women and Sex/Gender Differences in Drug and Alcohol Abuse/Dependence. Access these announcements by Googling PA-07-329, PA-07-330, or PA-07-331.

Goals

Incorporating sex/gender-based research perspectives and methodologies can inform and advance the science of drug abuse research. Growing numbers of studies are reporting research outcomes that are specific to either males or females and, in some cases, these outcomes are opposite in males and females. From basic studies of molecular genetics and neurotransmitters to studies of etiology, epidemiology, and prevention/treatment interventions, the scientific and clinical importance of studying factors specific to women and analyzing data separately for males and females is becoming more and more evident.



PET SCANS REVEAL DIFFERENCES IN METABOLIC ACTIVITY. Red indicates brain areas where metabolic activity was higher in women than in men during the Continuous Performance Test and Bushman Competition and Retaliation Task. Exposure to nicotine greatly reduced the size of these areas, suggesting the drug's ability to neutralize gender differences in task-driven brain activity.

Reprinted from *International Journal of Neuropsychopharmacology*, Vol 8(3): 513-528, Fallon, JH, et al: "Gender A major determinant of brain response to nicotine," ©2005 Reprinted with the permission of Cambridge University Press.

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