Director’s Report to the National Advisory Council on Drug Abuse

September 3, 2014

Nora D. Volkow, M.D., Director

National Institute on Drug Abuse
Director’s Report to the National Advisory Council on Drug Abuse

- Budget Update

- What’s New @ HHS/NIH?

- Recent NIDA Activities & Events
<table>
<thead>
<tr>
<th></th>
<th>FY 2013 Actuals</th>
<th>FY 2014 Enacted</th>
<th>FY 2015 PB</th>
</tr>
</thead>
<tbody>
<tr>
<td>NonAIDS</td>
<td>$692,655</td>
<td>$713,877</td>
<td>$722,554</td>
</tr>
<tr>
<td>AIDS</td>
<td>$300,749</td>
<td>$300,714</td>
<td>$300,714</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$993,404</td>
<td>$1,014,591</td>
<td>$1,023,268</td>
</tr>
</tbody>
</table>

FY14 Enacted includes AIDS transfers
Director’s Report to the National Advisory Council on Drug Abuse

• Budget Update

• What’s New @ HHS/NIH?

• Recent NIDA Activities & Events
New Developments

• New resubmission policy issued on April 17, 2014
  – Ideas that were unsuccessfully submitted as a resubmission (A1) will now be allowed to be presented in a new grant application (A0) without having to substantially redesign the content and scope of the project (see http://grants.nih.gov/grants/guide/notice-files/NOT-OD-14-074.html)
  – May result in more new A0 applications in FY2015 and beyond, with potential to lower the success rates
45 positive randomized controlled trials from 3 major medical journals (led to the spread of treatments such as hormone replacement therapy for menopausal women and daily low-dose aspirin to prevent heart attacks and strokes) analyzed in 2005, *JAMA*.

Of the 34 claims that had been subject to replication, 41% had either been directly contradicted or had their effect sizes significantly downgraded.

In genetic studies of sex differences, out of 432 claims, only a single one was consistently replicable.

The unspoken rule is that at least 50% of the studies published even in top tier academic journals — *Science, Nature, Cell, PNAS,* etc... — *can’t be repeated* with the same conclusions by an industrial lab. In particular, key animal models often don’t reproduce. This 50% failure rate isn’t
# NIDA’s Activities on Reproducibility

<table>
<thead>
<tr>
<th>Raising community awareness</th>
<th>Convened forum “Reproducibility of Research Results: Is it Relevant to the Addiction Research Community?” at CPDD 2014 and at Annual Symposium Current Trends in Drug Abuse Research, Northeastern University, 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhance formal training</td>
<td>Convened staff training “Why small sample size undermine the reliability of neuroscience” by Dr. Kate Button (Button, et al., 2013, Nature Reviews Neuroscience) Developed funding initiative to guide, assist or educate investigators on design and execution of animal experiments.</td>
</tr>
<tr>
<td>Pilot on reproducing selected NIDA-sponsored research projects</td>
<td>The Reproducibility Initiative independently validates key experimental results using the Science Exchange network of experts.</td>
</tr>
<tr>
<td>Improving evaluation of applications</td>
<td>Developed Notices: “Improving Reporting of Research Methods and Results in Translational Addiction Research Involving” and “Points to Consider for NIDA Grant Applications Involving Preclinical Animals”</td>
</tr>
<tr>
<td>Analysis of Bias and Irreproducibility Risk Reduction in Animal Studies</td>
<td>Analyzed how many NIDA grants from 2008 to 2014 reported measures to reduce risk of bias and irreproducibility in animal studies. The number of grants reporting animal species, test name, N, sample size calculation, effect size, randomization (means of randomization), and blinding (means of blinding) was determined.</td>
</tr>
</tbody>
</table>
Theme G: Novel Methods and Technology Development
Enhancing Reproducibility of Neuroscience Studies
Sunday, November 16, 2014 -- 8:30am to 11am -- Location: Ballroom A

Chair: Story Landis, PhD, NINDS, NIH
Co-Chair: Thomas Insel, MD, NIMH, NIH

Panel Members
Francis S. Collins, MD, PhD, Director, NIH
Nora D. Volkow, MD, Director, NIDA, NIH
Huda Y. Zoghbi, MD, Baylor College of Medicine
John H. Morrison, PhD, Icahn School of Medicine at Mount Sinai
Veronique Kiermer, PhD, Executive Editor & Head of Researcher Services, Nature Publishing Group

- Summarize common causes of poor reproducibility
- Describe actions taken by NIH and journals to improve reliability
- Offer investigator perspectives
- Address relevance for training
# Blueprint Neurotherapeutics Network (BPN): Small Molecule Drug Discovery and Development For Disorders of Nervous System

<table>
<thead>
<tr>
<th>Assay Validation</th>
<th>Exploratory Chemistry</th>
<th>Hit-to-Lead Chemistry</th>
<th>Proof of Concept</th>
<th>Lead Optimization</th>
<th>Candidate Selection</th>
<th>Preclinical Safety</th>
<th>Phase I Trial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry AMD (Petrukhin)</td>
<td><strong>Alzheimer’s/MCI (Gurney)</strong></td>
<td><strong>Alzheimer’s (Wagner)</strong></td>
<td><strong>Familial Dysautonomia (Slaugenhaupt)</strong></td>
<td><strong>Smoking Cessation (Kenny)</strong></td>
<td>NIDA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression (Lark)</td>
<td>Wet AMD (Li/Ostanin)</td>
<td>Fragile X (Robichaud)</td>
<td>Hearing Loss (Rubel)</td>
<td>Narcolepsy (Humphries)</td>
<td>ALS (Glicksman)</td>
<td>Parkinson’s (Surmeier)</td>
<td>Subarachnoid Hemorrhage (Dingledine)</td>
</tr>
</tbody>
</table>
**Orexin Receptor Antagonists for Drug Addiction**

**Paul J. Kenny, PhD, Eolas Therapeutics, Inc. (prev. at Scripps, FL)**

**Start Date: June 1, 2013**

**HYPOTHESIS**

Selective antagonists of orexin 1 receptor will reduce nicotine-seeking behavior without sleep effects associated with orexin 2 receptor.

**INITIAL LIABILITIES**

- CYP 3A4 inhibitor
- Limited intellectual property potential
- Moderate brain penetration

**PROGRESS**

A novel orexin-1 receptor antagonist decreases relapse-like behavior: compound attenuates cue-evoked nicotine seeking and decreases nicotine intake in rats at doses that do not affect responding for food rewards.

**Nicotine-Seeking Behavioral Assay**

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**Nicotine-Seeking Behavioral Assay**

- Baseline 123456
- Presses on active lever
- Responding during extinction (drug and cues withheld)
- Extinction day
- **P<0.01, Paired t-test**

**Nicotine-Seeking Behavioral Assay**

- Baseline 123456
- Presses on active lever
- Reinstatement day (cue lights only)
- Vehicle 982 (mg/kg)
- **P<0.01, Paired t-test**
BRAIN Multi-Council Working Group (MCWG)

• Provide scientific advice to the BRAIN IC staff and funding process to complement the expertise of the individual councils

• Members will ensure that each of the advisory councils is informed about BRAIN initiatives, awards and progress.

• First meeting -- August 25 – review of applications* received for 6 FOAs. Reviewed concepts for BRAIN 2015 initiatives

*applications still have to be approved by lead IC Council
## Recent Progress

### Fiscal Year 2014 RFAs

<table>
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<tr>
<th>RFA</th>
<th>Topic</th>
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<tbody>
<tr>
<td>MH-14-215</td>
<td>Cell-Type Classification</td>
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<tr>
<td>MH-14-216</td>
<td>Novel Tools - Cells and Circuits</td>
</tr>
<tr>
<td>MH-14-217</td>
<td>Next Generation Human Imaging</td>
</tr>
<tr>
<td>NS-14-007</td>
<td>Large scale Recording &amp; Modulation</td>
</tr>
<tr>
<td></td>
<td>- New Technologies</td>
</tr>
<tr>
<td>NS-14-008</td>
<td>Large scale Recording &amp; Modulation</td>
</tr>
<tr>
<td></td>
<td>- Optimization</td>
</tr>
<tr>
<td>NS-14-009</td>
<td>Integrated Approaches to Understanding Circuit Function</td>
</tr>
</tbody>
</table>
Options for Fiscal Year 2015

Re-issue Some of the FY14 RFAs

- Cell-Type Classification
- Novel Tools - Cells and Circuits
- Next Generation Human Imaging
- Large scale Recording & Modulation Technologies
- Integrated Approaches to Understanding Circuit Function

Concepts for New Initiatives

- **Micro-Scale Connectivity** – Benchmark data and transformative approaches
- **Human Brain Recording and Modulation** – *Multi-disciplinary teams* to investigate *human brain (dys)function*; *Next generation human technologies*: pre-clinical and early *phase human testing*, *public-private partnerships*
- **Multi-Scale Approaches** – Understand the biophysics and information content of *macro-scale signals*
- **Short Courses** – *Training in new technologies, data analysis and theory*
- **SBIR announcement(s)** – *BRAIN-affiliated SBIR, new technologies from small businesses*
The Role of Opioids in the Treatment of Chronic Pain
September 29-30, 2014

- Long-term effectiveness of opioids for treating chronic pain
- Potential risks of opioid treatment in various patient populations
- Effects of different opioid management strategies on outcomes related to addiction, abuse, misuse, pain, and quality of life
- Effectiveness of risk mitigation strategies for opioid treatment
- Future research needs and priorities to improve the treatment of pain with opioids

Sponsored by the NIH Office of Disease Prevention and NIH Pain Consortium
Effectiveness and Risks of Long-term Opioid Treatment of Chronic Pain
Agency for Healthcare Research and Quality (AHRQ), through its Evidence-based Practice Centers (EPCs)

Report systematically reviews current evidence on effectiveness and harms of opioid therapy for chronic pain, focusing on long-term (>1 year) outcomes

Key Questions
1. Effectiveness & comparative effectiveness
2. Harms & adverse events
3. Dosing strategies
4. Risk assessment & risk mitigation strategies

For a number of Key Questions, we identified no studies meeting inclusion criteria. Where studies were available, the strength of evidence was rated no higher than low, due to imprecision and methodological shortcomings
Director’s Report to the National Advisory Council on Drug Abuse

- Budget Update
- What’s New @ HHS/NIH?

Recent NIDA Activities & Events
National searches for DER and DESPR Directors underway
Priority Areas

**Prevention Research**

(Children & Adolescents)
- genetics/epigenetics
- development
- environment
- co-morbidity

**Treatment Interventions**

(New Targets & New Strategies)

**HIV and Drugs**

- Prevention
- Treatment
Regular Marijuana Use, Persons Aged 12 or Older: 2002-2012

Source: National Survey on Drug Use and Health, SAMHSA

Monitoring the Future (MTF)

% 12 Graders Reporting Regular Marijuana Use vs. Perceived Risk of Regular Marijuana Use

Source: The Monitoring the Future study, the University of Michigan
Marijuana Consumption by American Indians on or Near Reservations

**% Regular Use**

<table>
<thead>
<tr>
<th>Year</th>
<th>AIAN</th>
<th>MTF</th>
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<tbody>
<tr>
<td>8th</td>
<td></td>
<td></td>
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<tr>
<td>10th</td>
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<tr>
<td>12th</td>
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</table>

**Age of Initiation**

<table>
<thead>
<tr>
<th>Age in Years</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
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</thead>
<tbody>
<tr>
<td>% Regular Use</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
</tr>
</tbody>
</table>

**Beauvais et al., Drug Use Among Young American Indians: Epidemiology and Prediction, 2001-2006 and 2009-2013. ICPSR35062-v1. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2014-08-05; Johnston et al., 2012.**
Planned Strategy

✔ Expert panel workshop develop recommendations on best large-scale designs and measures to assess developmental effects of substance exposure (beginning prior to exposure) during childhood through adolescence (in human subjects) – May 27-28, 2014

✔ An RFI to get input on proposed study design/measures June-August 2014

Revised design based on input from RFI to be presented for further input at a satellite symposium at SfN Monday Nov 17, from 6:30-8:30, Walter E Washington Convention Center Rm 150A

FOA to be released early in 2015
**Young Brains on Drugs**

The debate over legalization, decriminalization, and medical uses of marijuana in the United States is missing an essential piece of information: scientific evidence about the effects of marijuana on the adolescent brain. Much is known about the effects of recreational drugs on the mature adult brain, but there has been no serious investigation of the risks of marijuana use in younger users. In April 2014, a controversial study* suggested that “casual” use of marijuana is associated with structural abnormalities in the brains of young people (aged 18 to 25), particularly in regions vital to emotion, motivation, and decision-making. The fact that the findings are preliminary and disputed indicates that rigorous research is needed to inform discussions about the public health benefits and risks of legal marijuana.

Although marijuana remains illegal for people under the age of 21 in the United States (including in the two states that have legalized it for adults), young people will almost certainly have greater exposure to, and likely more ways to access, the drug (as they already do with alcohol and tobacco), as new initiatives to change marijuana laws in many states come to fruition. Proponents of legalization argue that the medically harmful effects of marijuana are “no worse” than those of alcohol and tobacco. But even if that is true, it does not mean that the risks are the same. Over the decades, the United States has funded research to study the long-term health effects of alcohol and tobacco, but not marijuana. Yet many of the worst and most worrisome brain pathologies from drug use are seen in mental health (as opposed to pulmonary disease and cancer with smoking, and gastric and liver disease with alcohol), where marijuana use is associated with, among other conditions, anxiety and psychiatric disorders. Research suggests that early marijuana use is linked to these problems, but their biological underpinnings are a mystery.

The National Survey on Drug Use and Health has repeatedly found that children who began alcohol or marijuana use before age 15 had a fivefold-increased prevalence of substance use disorders later in life. This may be due to effects of early drug use on the trajectory of the brain’s subsequent development, but we don’t know for sure. What is needed are large longitudinal cohort studies to examine whether marijuana use causes changes in brain function and behavior in young people. The Framingham Heart Study, still ongoing after its initiation 55 years ago, revolutionized our understanding of what causes cardiovascular disease, producing completely unanticipated findings that have led to improved health care and public policy.

The U.S. National Institutes of Health should launch a similar long-term study of preadolescent children and follow them through adolescence into young adulthood, when their brains are most plastic, rapidly developing, reorganizing, and forming enduring neural connections and circuits. The rapid growth of brain science in the past two decades has generated new methods to measure the effects of drugs on brain structure and mental processes. With “big brain” research projects now under way in the United States and Europe, including the BRAIN Initiative announced by President Obama in 2013, to deduce how brain function is linked to behavior and disease, the time is right to rigorously pursue a long-term study of drug effects. Without more scientific evidence to inform policies, we are gambling with the health and safety of our youth in making decisions about psychoactive substances such as marijuana when their real risks are unknown.

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*Robert L. DuPont and Jeffrey A. Lieberman

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**News**

**Teen drug use gets supersize study**

US government program will examine 10,000 adolescents to document effects on developing brains.

BY SARA REARDON

When the states of Colorado and Washington voted to legalize marijuana in 2012, the abrupt and unprecedented policy switch sent the US National Institute on Drug Abuse (NIDA) into what its director Nora Volkow describes as “red alarm.” Although marijuana remained illegal for people under the age of 21, the drug’s increased availability and growing public acceptance suggested that teenagers might be more likely to try it (see “Highs and lows”). Almost nothing is known about whether or how marijuana affects the developing adolescent brain, especially when used with alcohol and other drugs. The new laws, along with advances in brain-imaging technology, convinced Volkow to accelerate the launch of an ambitious effort to

**Highs and Lows**

Attitudes toward marijuana use among US students in grade 12 (aged 17-18) have changed dramatically.

- Perceived harm
- Post-attributed use

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<tr>
<td>Perceived harm</td>
<td>80</td>
<td>75</td>
<td>70</td>
<td>65</td>
<td>60</td>
<td>55</td>
<td>50</td>
<td>45</td>
</tr>
<tr>
<td>Post-attributed use</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
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</tbody>
</table>

**In Focus**

**Neuroscience**

Robert L. DuPont was the first director of the US National Institute on Drug Abuse (1973-1978) and is president of the Institute for Behavior and Health, Rockville, MD.
National Longitudinal Study of Adolescent Brain and Cognitive Development (ABCD) @ SfN-- November 17, 2014 -- Washington, D.C.

- Sponsored by the NIH CRAN (NIDA, NIAAA, & NCI) in partnership with NICHD
- Workshop to *solicit input for a large-scale prospective cohort study* to assess developmental effects of substance use from early adolescence into young adulthood in human subjects.
- The study goals are to understand the impact of various patterns and trajectories of substance exposure on brain structure and function; future SUD or other psychopathology; and functional outcomes, including academic achievement, social development and other behaviors of public health importance.
Priority Areas

Prevention Research
(Children & Adolescents)
genetics/epigenetics
development
environment
co-morbidity

Treatment Interventions
(New Targets & New Strategies)

HIV and Drugs
Prevention
Treatment
Varenicline + NRT vs Varenicline Alone for Smoking Cessation

*Point Prevalence Abstinence Rates*

Koegelenberg CFN et al., JAMA. 2014;312(2):155-161.

Varenicline + Bupropion vs Varenicline Alone Smoking Cessation


Men Show Substantial Response To Combination Therapy
<table>
<thead>
<tr>
<th>Compound/Target</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>ADP Ribose Polymerase 1 (PARP-1) Inhibitors</td>
<td>Kimberly Scobie</td>
</tr>
<tr>
<td>Aldehyde Dehydrogenase 2 (ALDH-2) Inhibitors</td>
<td>Ivan Diamond</td>
</tr>
<tr>
<td>Dopamine D4 Receptor Antagonists</td>
<td>Jack Bergman</td>
</tr>
<tr>
<td>F-actin Polymerization</td>
<td>Courtney Miller</td>
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<tr>
<td>Glutamate Transport Activators</td>
<td>Peter Kalivas</td>
</tr>
<tr>
<td>Glyceraldehyde 3-Phosphate Dehydrogenase Inhibitors (omigapil)</td>
<td>Maget M. Harraz</td>
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<tr>
<td>Histone Deacetylase (HDAC) Inhibitors</td>
<td>Pamela J. Kennedy</td>
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<tr>
<td>Metabotropic Glutamate Receptor 7 (mGluR7) Agonists</td>
<td>Athina Markou</td>
</tr>
<tr>
<td>Neurokinin 1 (NK1) Receptor Antagonists</td>
<td>Foster Olive</td>
</tr>
<tr>
<td>Phosphodiesterase 7 (PDE7) Inhibitors</td>
<td>Gregory Demopulos</td>
</tr>
<tr>
<td>Toll-like Receptor 4 (TLR-4) Antagonists</td>
<td>Linda Watkins</td>
</tr>
</tbody>
</table>

Consultants will evaluate targets based on validation, feasibility, druggability, etc.

- Larry Altstiel, Provectra Pharmaceuticals
- Anne Andorn, GlaxoSmithKline
- Robert Lenox, RHL Consulting
- Darryle Schoepp, Merck Research Labs
- James Barrett, Drexel University
- Thomas Large, Sunovion Pharmaceuticals
The National Drug Abuse Treatment Clinical Trials Network (UG1) RFA-DA-15-008.

Issued: July 3, 2014; Open date: November 3, 2014; Application Due Date: December 3, 2014.

Invites applications from clinical investigators to participate in the National Drug Abuse Treatment Clinical Trials Network (CTN).

NIDA intends to expand its research to develop and test interventions for the management of the wide spectrum of SUD with input from and collaboration with clinical investigators, healthcare providers, patients and relevant stakeholders.
Priority Areas

Prevention Research

(Children & Adolescents)
genetics/epigenetics
development
environment
co-morbidity

Treatment Interventions

(New Targets & New Strategies)

HIV and Drugs

Prevention
Treatment
2014 Avant Garde Awardees

Stephen Waggoner, Ph.D.
Cincinnati Children’s Hospital Medical Center
Project: A revolutionary vaccine approach to prevent HIV infection in substance abuse
-- preventing natural killer cells from destroying activated helper CD4 cells, to strengthen vaccine effectiveness

Heinrich Gottlinger, M.D.
University of Massachusetts Medical School, Worcester
Project: Mechanism of HIV cell-cell transmission of relevance to substance users
-- roles of two specific proteins involved in HIV’s movement from an infected to an uninfected cell

Melanie Ott, M.D., Ph.D.
Gladstone Institutes, San Francisco
Project: A new model of accelerated immune aging in HIV-infected drug users
-- role of an enzyme (SIRT-1) in slowing accelerated immune aging from either long-term HIV infection or drug use
NIH HIV/AIDS High Priority Areas

• November 2013:
Dr. Collins charges OAR’s Advisory Council with the task of identifying NIH’s Top HIV/AIDS Research Priority Areas

• June 2014:
Dr. Whitescarver Presents Recommendations for NIH’s HIV/AIDS research priority areas to Dr. Collins’ Advisory Council

**Priority Areas**

1. Prevention
2. Treatment
3. STTR
4. CURE
5. Co-morbidities
6. Basic Science
7. Behavioral & Social Sciences
8. Implementation Science
9. Training
10. Dissemination
NIH Towards the Cure Initiatives emphasis are on virus in primary peripheral sites (CD4+ and other immune cells)

NIDA initiatives will emphasize two critical areas for a Cure:
1) Towards a cure in brain (in vivo emphasis with in vitro components)
2) Towards a cure in substance using populations (in periphery)

Critical research on reservoirs within macrophage, microglia, and astrocytes:
- establishment/maintenance of latent reservoirs; persistent infection; viral rebound & eradication; Role of DNA elements, transcriptional activity, and epigenetic mechanisms
- neuronal/glial interactions (iPSCs from SU); inflammatory mediators
- how brain (macrophage, microglia, and astrocyte) latent virus reservoirs may differ from other latent reservoir sites –include effects of substances of abuse and ART on integrity of reservoir
Background
- Last updated in 2010
- **Highlight advances in the field to inform future directions in key areas**
- Prevention, treatment, HIV, cross-cutting priorities

Current/Future Issues
- Leveraging new technologies
- Promoting open access to data
- Developing standards, infrastructure, and tools to support utilization of big data
- Integration with the Presidents BRAIN Initiative
- Responding to changes in state marijuana policies
- Adapting to changes in the healthcare landscape due to health reform
- Medications development?
Approach
• **Input from multiple sources:**
  - NIDA program staff
  - NIDA Advisory Council
  - Researchers
  - Constituent organizations
  - Consumer groups
  - Other Stakeholders

• **Key Mechanisms:**
  - Bold Goals Challenge Prizes
  - Request for Information (RFI)/Public Comment
  - Priority Area/Cross - Cutting Work Groups

• **Publication:** Fall 2015
Congressional Hearings/Meetings

- **May 9, 2014**: Dr. Compton participated in *Hepatitis on the Hill* briefing organized by Harm Reduction Coalition and National Association of State and Territorial AIDS Directors.

- **May 14, 2014**: Dr. Volkow testified in Senate Caucus on International Narcotics’ hearing on *Causal Role Prescription Drug Abuse has had on the Increased Use of Heroin in United States*.

- **May 28, 2014**: Dr. Weiss briefed Senator Elizabeth Warren’s (D-MA) staff on marijuana research at NIDA.

- **June 3, 2014**: Dr. Compton briefed Senator Jack Reed’s (D-RI) staff on opiate abuse and addiction research at NIDA.

- **June 10, 2014**: Dr. Volkow met with and briefed Senator Lisa Murkowski (R-AK) on marijuana health and research issues.

- **June 18, 2014**: Dr. Volkow participated in Senate Forum on *Buprenorphine use in treatment of opiate addiction* sponsored by Senator Carl Levin (D-MI) and Senator Orrin Hatch (R-UT).

- **June 19, 2014**: **Friends of NIDA Capitol Hill Briefing.** Dr. Compton participated in briefing “*Marijuana: Health Effects, Changing Patterns of Use and Societal Impact.*”
Congressional Hearings/Meetings

- **June 20, 2014**: Dr. Volkow briefed U.S. Representative John Fleming (R-LA) on *Health effects of and NIDA research into marijuana abuse and addiction.*

- **June 20, 2014**: Dr. Volkow testified in a hearing on marijuana from the House Oversight and Government Reform Subcommittee on Government Operations [Chairman, John Mica, (R-FL)].

- **June 27, 2014**: Dr. Volkow briefed the Clerks of the Senate Appropriations Subcommittee on Labor, Health and Human Services, and Pensions on NIDA research priorities and challenges.

- **July 9, 2014**: Dr. Compton briefed Senator Mitch McConnell’s (R-KY) staff on opiate abuse.

- **July 15, 2014**: Dr. Volkow participated in Capitol Hill briefing on *Womens Health* sponsored by Womens’ Health Caucus, and organized by Womens Policy, Inc., with support from RWJ.

- **August 6, 2014**: Dr. Volkow participated in a community forum in Boston, MA organized by U.S. Senator Edward Markey (D-MA), on *opiate addiction and overdose issues*. Participating agencies ONDCP, SAMHSA and DEA.

- **August 13-14, 2014**: Dr. Volkow participated in a community forum and “coalfields tour” in southeastern West Virginia organized by U.S.Representative Nick Rahall (D-WV), focused on *opiate addiction and overdose issues.*

- **August 14, 2014**: Dr. Weiss briefed Senate Drug Caucus staff on marijuana.
2014 ISEF Addiction Science Awards

Lily Wei Lee
Stuyvesant High School in New York City
Assessment of Third Hand Exposure to Nicotine from Electronic Cigarettes

Aakash Jain
Brophy College Preparatory in Phoenix
Computational Analysis of the GABA(A) Receptor

Alexandra Ulmer & Sarayu Caulfield
Oregon Episcopal School in Portland
Capacity Limits of Working Memory: The Impact of Multitasking on Cognitive Control and Emotion Recognition in the Adolescent Mind
Frontiers in Addiction Research Mini-Convention
November 14, 2014

Includes four scientific symposia, keynote presentations by the 2013 & 2014 winners of the SfN Jacob P. Waletzky Award, and a poster session showcasing the work of early career investigators.

The symposia this year are:

- Emerging & Novel Aspects of Neuronal Transmission
- Extracellular RNAs in Neuroscience: Biology, Biomarkers, & Therapeutics
- Advances in High Resolutions & Large Scale Imaging of Brain Networks & Circuits
- The Effects of Drug-, Stress-, & Pain-induced Neuroinflammation on Glymphatics & Sleep