Gene x Environment x Development Interactions (GEDI)
NIDA Strategic Planning Workgroup

April 17, 2015
Organizational Meeting

Co-Chairs:
Naimah Weinberg, M.D. (NIDA)
Jonathan Pollock, Ph.D. (NIDA)
WebEx Logistics

• Workgroup members have been made panelists in this WebEx Event
• You should have received the special panelist WebEx access url by email
• **First**, join the WebEx Event by clicking on your panelist url and enter all passcodes and passwords contained in the email
WebEx Logistics

- **Second**, join the WebEx Event by phone
  - Please dial in through the phone instead of using your computer and enter access code and attendee ID:

  1. Call
     1-877-[redacted] (Call-in toll-free number (US/Canada))
     1-650-[redacted] (Call-in toll number (US/Canada))

  2. Enter this access code:
     62-[redacted] #

  3. Enter your Attendee ID:
     3 #
WebEx Logistics

- **Third**, you may mute yourself during the event to reduce background noise.
- We will mute panelists as necessary to control noise. Please **unmute to speak**.
WebEx Logistics

• **Note:**
  – All strategic planning WebEx events are **open to the public and recorded**
  – Non-workgroup members (attendees) will be muted throughout the meeting until the end
    • Public comments and questions will be accepted via chat and phone during the last 5 minutes
  – There is a note-taker on the call and summaries will be posed on the website: [http://www.drugabuse.gov/about-nida/strategic-plan](http://www.drugabuse.gov/about-nida/strategic-plan)
Agenda

1. Introductions
2. NIDA Strategic Planning Process
3. Workgroup Charge
4. Workgroup Logistics
5. Background and Context
6. Discussion
7. Questions/comments
8. Action Items
9. 5 Minute Public Comment Period
10. Adjourn
## GEDI Work Group Members

<table>
<thead>
<tr>
<th>NAME</th>
<th>AFFILIATION</th>
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<tr>
<td><strong>WORKGROUP CHAIRS</strong></td>
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<tr>
<td>Naimah Weinberg, MD</td>
<td>NIDA</td>
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<td>Jonathan Pollock, PhD</td>
<td>NIDA</td>
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<td><strong>EXTRAMURAL WORKGROUP MEMBERS</strong></td>
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<tr>
<td>Danielle Dick, PhD</td>
<td>Virginia Commonwealth University</td>
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<td>Margaret Daniele Fallin, PhD</td>
<td>Johns Hopkins Bloomberg School of Public Health</td>
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<td>Hugh Garavan, PhD</td>
<td>The University of Vermont</td>
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<td>John Rice, PhD</td>
<td>Washington University School of Medicine</td>
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<td>E. Jane Costello, PhD</td>
<td>Duke University Center of Developmental Epidemiology</td>
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<td>William G Iacono, PhD</td>
<td>University of Minnesota</td>
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<td>Kenneth Kendler, MD</td>
<td>Virginia Commonwealth University</td>
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<td>Eric Johnson, PhD</td>
<td>RTI International</td>
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<td>Gustavo Turecki, MD, PhD</td>
<td>McGill University</td>
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<td><strong>NIH STAFF</strong></td>
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<td>Maureen Boyle, PhD</td>
<td>NIDA</td>
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<td>Hal Gordon, PhD</td>
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<td>Raul Mandler, MD</td>
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<td>Michele Rankin, PhD</td>
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<td>Joni Rutter, PhD</td>
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<td>John Satterlee, PhD</td>
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NIDA Strategic Planning

• **December 2014**: RFI released to solicit feedback on NIDA’s draft strategic priorities:
  – **Basic Neuroscience**: Improve our understanding of the basic science of drug use, addiction, vulnerability to addiction, and recovery
  – **Clinical and Translational Science**: Support the development of new and better interventions and treatments that incorporate the diverse needs of individuals with Substance Use Disorders (SUDs)
  – **Public Health**: Increase the public health impact of NIDA research and programs
  – **Science Infrastructure**: Enhance the national research infrastructure to support advancements in science

• **January 30, 2015**: Comment period closed
Updating the NIDA Strategic Plan

• **Next steps:**
  – **Bold Goals Challenge:** award up to $10k in prizes for top ideas

  – **Priority Area Workgroups:** created to gather input from internal and external experts on cross-divisional topics to develop strategic priorities for:
    • Big Data
    • Gene x Environment x Development interactions
    • Complex patients (multiple comorbidities)

  – NIDA Division strategic planning is underway
NIDA Strategic Planning Timeline

- **RFI** – closed Jan 30, 2015
  - Review comments, by Mar 6, 2015
- **Priority Area Workgroups**
  - February through July, 2015
- **Bold Goals Challenge**
  - Winner selection, by August 2015
- **Draft Strategic Plan out for public comment**
  - Summer 2015
- **Final Strategic Plan**
  - Fall 2015
Workgroup Charge

• Develop strategic priorities for increasing our understanding of gene x environment x development interactions in substance use research.
  – Identify measureable objectives for each priority
  – Specify benchmarks for gauging progress toward each objective

• **Deliverable**: 3-5 page summary of recommendations for NIDA on GEDI research for the next 5 years

• **Completion date**: by Friday June 26th
Cross-cutting Themes to Consider During Strategic Planning

- The workgroup should also consider these cross cutting themes as appropriate
  - Training needs (training of clinicians common theme in RFI comments)
  - Addressing sex and gender issues
  - How to leverage technology advances
  - Leveraging innovations from other fields
Workgroup Logistics

• Meet biweekly on Tuesdays from 3-4 pm EDT via WebEx
• All meetings are open to the public and will be recorded
• Meeting summaries will be provided to workgroup members within 5 business days
• All correspondence should be sent to: NIDAOSPCPlanning@mail.nih.gov
• A web-based site will be established to facilitate document sharing
Background and Context

- NIDA investment in genetics research for fiscal years 2011-2014
- Distribution of funding by project activity and research area
- Research successes
- Research opportunities
NIDA FY14 Genetics Grants Portfolio

Total: Projects=334
Total Funding: Extramural grants, contracts, and IRP $109,367,884
## NIDA Genetics Budget for past 5 years

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<td>Gene-Environment Interplay in Substance Use Disorders</td>
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<tr>
<td>Functional Genetics, Epigenetics, and Non-coding RNAs in Substance Abuse</td>
<td>PA-14-025 (R01)</td>
<td>December 10, 2013</td>
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Research Successes

• Identification of genetic polymorphisms on 15q25 associated with nicotine addiction and development of precision medicine based on these polymorphisms.

• Identification of the SNP within *CHRNB3-A6* associated with DSM-5 cocaine use disorder is rs9298626.

• Identifications of variants for clearance of HCV

• Demonstration that A118G associated with opiate dependence increases heroin self-administration across days in transgenic mice engineered with the same variant.

• QTL on chromosome 11 regulates cocaine response

• Epigenetic control of ΔFosB expression in NAc regulates cocaine-elicited behaviors
Research Successes, continued

• Both polysubstance use and its shared etiology drop in late adolescence and early adulthood, while non-shared factors in alcohol, nicotine, and marijuana dependence predominate.

• Parent to child transmission of SUD risk is primarily due to nonspecific liability to externalizing disorders and genetic in nature; shared environmental factors play a greater role than previously thought and point to sibling transmission as an important environmental risk factor for externalizing disorders.

• A polygenic risk score approach found that smoking, alcohol, and cannabis use are influenced by aggregated, shared genetic risk factors. Many common genetic variants have a very small individual effect.

• Creative family designs contribute to understanding complex relationships between SUDs and psychiatric disorders:
  – Co-relative control design of national registry data suggests that family confounding contributes to cannabis-schizophrenia association.
  – A co-twin control study suggests that early onset cannabis use and early school leaving are highly correlated but do not support a causal relationship between adolescent cannabis use and low educational attainment.
GxExD Interaction Challenges

- Quantitative phenotypes
- Methods to quantify environmental variables and responses
- Statistical methods to analyze GxE that overcome multiple comparison problems, harmonize data
- Appropriate animal models to identify epistasis, pleiotropy, gene-development interactions
- Translating findings in animals to humans
GEDI Gaps and Opportunities

• What research opportunities exist that NIDA should develop/expand? Prioritize.

• What are potential new areas of research? Prioritize.

• What resources are needed?

• What are the training needs?

• Are there any other gaps and opportunities that NIDA should consider?
Plan to Accomplish Research Goals

• Charge to the GEDI workgroup:
  – Identify research priorities
  – List objectives for each priority
  – Identify benchmarks to measure progress towards each objective

Questions about what the workgroup is charged to do?
Resources for Work Group

- **NIDA Strategic Planning website** - All activities surrounding strategic planning efforts must be publically reported. OSPC has established a webpage that will provide this information to the public throughout the entire planning process and can be found here: [http://www.drugabuse.gov/about-nida/strategic-plan](http://www.drugabuse.gov/about-nida/strategic-plan)


- **NIDA email for public comments** - For questions or concerns please contact the NIDA Strategic Planning Committee at NIDAOSPCPlanning@mail.nih.gov


- **Archived Meeting Summaries for Genetic Portfolio Reviews**
  - **Review of NIDA's Portfolio of Research on the Genetic Epidemiology of Drug Abuse**
    - Organizer: Naimah Weinberg
    - Date: February 22, 2005
  - **The Role of Behavior Genetics Research in NIDA’s Vulnerability to Drug Addiction Initiative**
    - Moderator: Naimah Weinberg
    - Date: May 27, 1999


- **Archived RFAs, PAs, and Notices in the NIH Guide for Genetics and Epigenetics** - [http://www.drugabuse.gov/researchers/research-resources/genetics-research-resources/funding-genetics-research/archived-rfas-pa](http://www.drugabuse.gov/researchers/research-resources/genetics-research-resources/funding-genetics-research/archived-rfas-pa)
Meeting Wrap-up

- Action items for next meeting
  - Workgroup homework

- Public comment period – 5 minutes

- Adjourn

*Next Meeting – 3:00-4:00 pm EDT, Tuesday, April 28, 2015*