

Behavioral Research Program

Leveraging Cognitive Neuroscience Research to Improve Assessment of
Cancer Treatment Related Cognitive Impairment

Using WebEx and Webinar Logistics



Tracey Goldner
Communication Fellow
National Cancer Institute

- Submit questions at any time during the presentation. Type into the Q&A feature on the right of the interface and press “submit”
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Webinar Format



Moderator

Paige Green, PhD, MPH

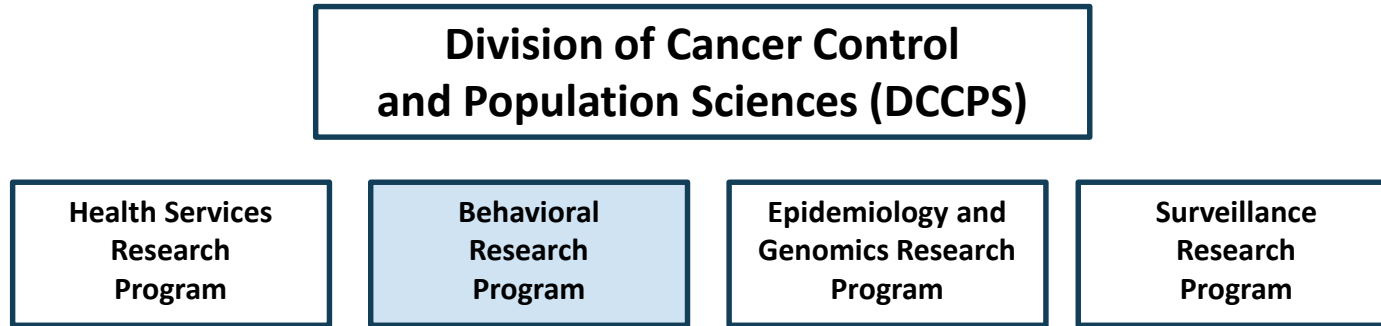
Chief, Basic Biobehavioral and
Psychological Sciences Branch

- Background
- FOA Details
- Resources
 - When available, an archive of the webinar and FAQs will be posted at <http://cancercontrol.cancer.gov/funding-foa-applicants.html>
- Questions
 - Questions about specific aims or grant application details will not be addressed

Background

*Leveraging Cognitive Neuroscience Research
to Improve Assessment of
Cancer Treatment Related Cognitive Impairment*

NCI DCCPS Organizational Structure



The **Behavioral Research Program (BRP)** initiates, supports, and evaluates a comprehensive program of research including basic behavioral and psychological science as well as the development, testing, and dissemination of interventions in cancer control areas such as tobacco use, diet and energy balance, and sun protection.

cancercontrol.cancer.gov/brp/

How We Fund Grants

- Although most of our portfolio consists of investigator-initiated (unsolicited) grants, BRP may also support grant applications in a specific area of interest
 - Requests for Applications (RFA)
 - Identifies the specific receipt date(s), the estimated amount of funds earmarked for the initiative, the number of awards likely to be funded, and any specific criteria for scientific peer review; applications received in response to a particular RFA are reviewed by an Institute's Scientific Review Group
 - Program Announcements (PA)
 - Most PA applications are submitted with a standing receipt date and are reviewed with all other applications received at that time using standard peer-review processes
 - Program Announcement (PAR)
 - Program announcements with special receipt, referral, and/or review considerations

Grant Mechanisms – R01 and R21

NIH Research Project Grant (R01)	NIH Exploratory/Developmental Grant (R21)
<ul style="list-style-type: none">▪ Used to support a discrete, specified, and circumscribed research project▪ NIH's most commonly used grant program▪ No specific dollar limit unless specified in Funding Opportunity Announcement (FOA)▪ Advance permission required for \$500K or more (direct costs) in any year▪ Generally awarded for 3-5 years	<ul style="list-style-type: none">▪ Encourages new, exploratory, and developmental research projects by providing support for early stages of project development▪ Sometimes used for pilot and feasibility studies▪ Limited to up to two years of funding▪ Combined budget for direct costs for the two-year project period usually may not exceed \$275,000▪ No preliminary data is generally required

FOA Details

*Leveraging Cognitive Neuroscience Research
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Leveraging Cognitive Neuroscience Research to Improve Assessment of Cancer Treatment Related Cognitive Impairment

PAR-16-212 (R01) & PAR-16-213 (R21)



Contact:
Jerry Suls
240-276-6811
jerry.suls@nih.gov

Purpose of the FOAs

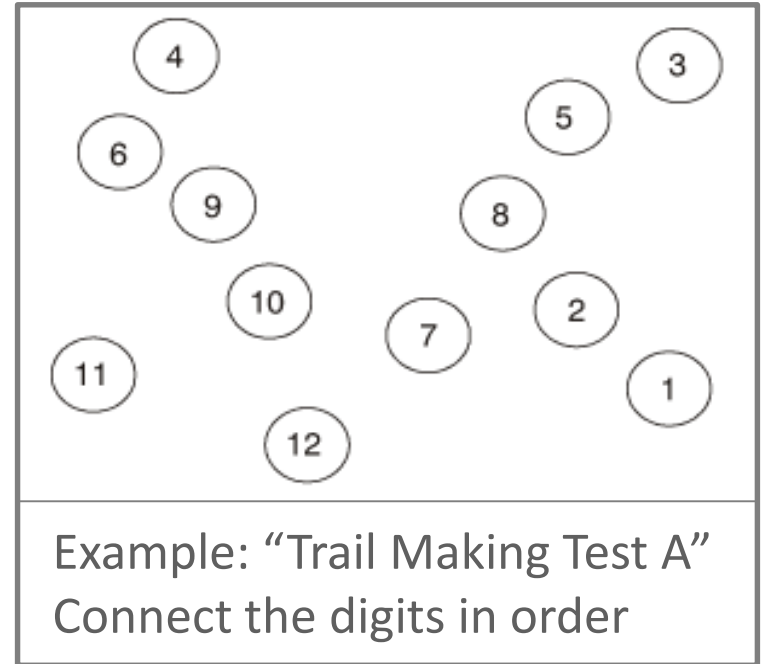
- To encourage transdisciplinary clinical and pre-clinical research that will leverage cognitive neuroscience to improve traditional measurement of cognitive impairment following cancer treatment, often referred to as “chemobrain”
 - Chemobrain defined as diffuse mental cloudiness that occurs at any point during or following chemotherapy that is presumed to be caused by neurotoxic effects of the treatment
 - Patients report problems with memory, attention, concentration, and other cognitive complaints
 - Animal models report similar problems in cognition and learning
- Current assessment of cognitive impairment following cancer treatment for non-CNS malignancies through self-reports and traditional neuropsychological tests has limitations

Limitations of Patient-Reported Outcomes

- May assess physical symptoms and quality of life, but not intended to identify the underlying cognitive impairment
- Patient reported outcomes often discordant with traditional neuropsychology tests
- Too blunt to delineate underlying impairment
 - “I can’t remember what I have just been told”
 - Attention?
 - Memory?

Limitations of Traditional Neuropsychology Tests

- Example:
 - Forgot order of digits
 - Memory?
 - Trouble searching for digits
 - Selective attention?
 - Difficulty drawing lines
 - Motor function?



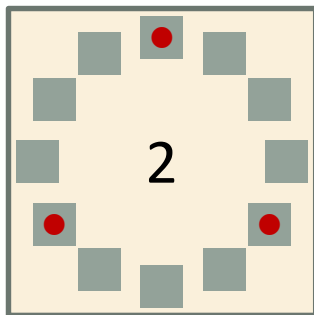
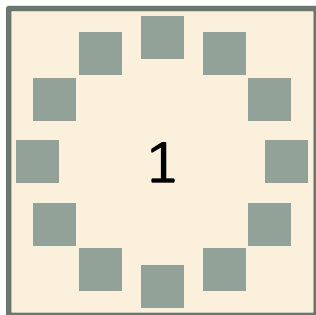
What is the Source of the Complaint?

- Patient reported outcomes and traditional neuropsychological tests suggest there is a deficit but not where the deficit stems from
- Cognitive science tests are capable of specifying the underlying impairment
- In addition, they are typically computer-administered and can be shorter and more efficient
- There is also potential for incorporation into the clinical trial intake process

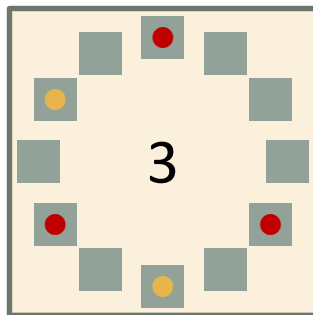
Cognitive Battery Example

Poor
performance
here indicates a
problem with
ATTENTION

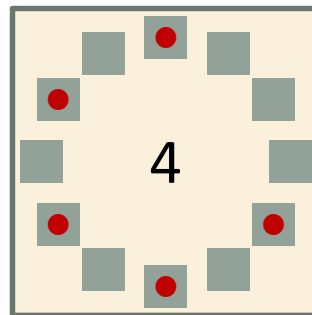
Poor
performance
here indicates a
problem with
MEMORY



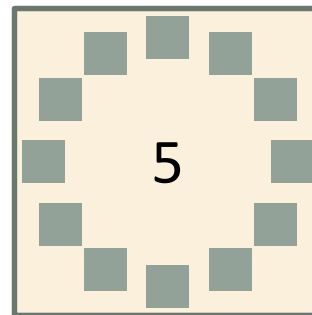
“Remember
the reds”



(Add
distractors)



(Add targets)



“Where were
the reds?”

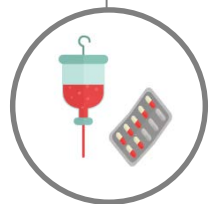
Example: Filtering task distinguishes selective attention & short-term memory

Example Research Questions

- Which specific cognitive functions are impaired following non-CNS chemotherapy treatments?
- Do performance changes on cognitive science tests predict gray and white matter changes or neuronal connectivity (assessed via structural or functional imaging) better than traditional neuropsychology tests and Toolbox assessments?
- How do the profiles of cognitive impairment differ based on cognitive science tests versus traditional neuropsychology tests or Toolbox?
- How can reliable and sensitive cognitive science tests be integrated into the standard of cancer care?
- How can more precise measurement of cognitive impairment inform the development and testing of strategies of remediation, clinical guidelines and effective survivorship care plans?



Study Design Considerations



- Essential

- Prospective longitudinal designs with pre-treatment baseline assessment prior to therapy and repeated assessments over time
- Include cognitive neuroscience-informed paradigms to identify impaired processes
- Use of traditional clinical neuropsychological assessment tools as comparisons (in patient studies)
- Relevant comparison group (patients not receiving chemotherapy and/or healthy age-matched controls)

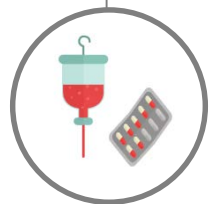
Choice depends on cancer site, stage, and treatment regimen



Study Design Considerations



- Optional
 - Structural and/or functional neuroimaging
 - Inclusion of QOL and functional outcomes



- For Preclinical Studies
 - Longitudinal designs are encouraged
 - Other design features should be justified in accordance with the specific aims of the project



Sample Evaluation Criteria

- Have the projects used cognitive science tests to identify the specific underlying impaired mechanism?
- Is the feasibility and predictive validity of cognitive tests greater than conventional testing?
- Have results provided a scientific basis to inform care planning and accommodation strategies?
- Understudied and demographically diverse samples (low SES, rural, race/ethnicity) encouraged
- Transdisciplinary approach encouraged (cognitive science, medical oncology, cancer epidemiology, clinical neuropsychology, psychometrics, human development and aging, preclinical models of human cancer, statistical modeling, behavioral science)
- *Not* intended to support: Analysis of existing data; Retrospective or cross-sectional research designs; Brain imaging technologies, exclusively

Other Important Information

- FOAs are PARs that will be evaluated by reviewers with relevant expertise in cognitive science, oncology, neuroscience, animal models, and psycho-oncology
- R01s are 3-5 year grants, which require preliminary studies
- R21s are 2-year grants, which are considered exploratory and do not require preliminary data
- Grants with direct costs \geq \$500,000 in any year require special Program approval for submission
 - Submit materials to Program Director at least 8 weeks prior to receipt date
 - Any Facilities and Administrative costs of subcontracts are not included
 - For more information: <http://epi.grants.cancer.gov/funding/ara/>

Resources

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Read the FOAs Very Carefully!

- [PAR-16-212 \(R01\) http://grants.nih.gov/grants/guide/pa-files/PAR-16-212.html](http://grants.nih.gov/grants/guide/pa-files/PAR-16-212.html)
- [PAR-16-213 \(R21\) http://grants.nih.gov/grants/guide/pa-files/PAR-16-213.html](http://grants.nih.gov/grants/guide/pa-files/PAR-16-213.html)
- Open Date (Earliest Submission Date): September 13, 2016
- Application Due Date: October 13, 2016; April 11, 2017; October 10, 2017; April 11, 2018; October 10, 2018; April 11, 2019
- Scientific Merit Review: March 2017; July 2017; March 2018; July 2018; March 2019; July 2019
- Advisory Council Review: May 2017; October 2017; May 2018; October 2018; May 2019; October 2019
- Earliest Start Date: July 2017; December 2017; July 2018; December 2018; July 2019; December 2019
- Expiration Date: April 12, 2019

Additional Resources

- Links to all NCI/BRP announcements and contact information can be found at <http://cancercontrol.cancer.gov/brp/funding/funding-opportunities.html>
- Funding for Extramural Cancer Training by the NCI Cancer Training Branch: <http://www.cancer.gov/grants-training/training/funding>

Resources for New Funding Announcements

- Today's webinar and list of FAQs (both leading up to and following the webinar) will be posted online:
 - <http://cancercontrol.cancer.gov/funding-foa-applicants.html>
 - There, you can also find links to FOAs and Program Director contact information
- Connect with any BRP staff member via contact information listed on:
 - <http://staffprofiles.cancer.gov/brp/>
 - Email questions to BRP anytime at ncidccpsbrpadvances@mail.nih.gov
 - Subscribe or unsubscribe from NCI/BRP email updates at <http://cancercontrol.cancer.gov/brp/e-newsletter/subscribe.html>

Questions

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The FOA encourages the applications of “...cognitive neuroscience theory and task paradigms, developed in the last three decades, for improved measurement and assessment of acute- and late-term cognitive changes following cancer treatment.” Does this mean that traditional clinical neuropsychological batteries should not be included?

To what extent are proposals that focus on both cognitive AND social/affective changes in response to cancer treatment of interest?

Must the NIH Cognitive Toolbox battery be included as a control?

What cancer sites are being studied?

Are applications exclusively to be focused on the effects of systemic chemotherapy?

U.S. Department of Health & Human Services
National Institutes of Health | National Cancer Institute

cancercontrol.cancer.gov/brp

1-800-4-CANCER

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