Moderator: Please stand by for real-time captions

Today's session is being recorded. If you have any objections, you may disconnect at this time. Thank you very much and on behalf of the National Cancer Institute, I wish to welcome everyone to the webinar on Funding for Cognitive Neuroscience. I'm delighted to welcome our presenter, Dr. Jerry Suls, Senior Scientist in the Behavioral Research Program at the National Cancer Institute. Our moderator today is Dr. Paige Green, Chief of the Basic Biobehavioral and Psychological Sciences Branch. A brief word about logistics and we'll be off.

We ask if you are not already on mute to please keep your phone on mute for the duration of today's presentation. This session is being recorded. Muting all lines will help us avoid any background noise. We encourage questions. They can be submitted by using the Q&A feature on the right-hand side of your screen. Type your question in the provided Q-and-A field and hit submit. We will open the session for questions when the presentation is finished. To access closed captioning, enable the media viewer pane on the right-hand side of your screen. If it is not visible select the arrow icon at the top right-hand side. Without any further ado it is my pleasure to turn the meeting over to Dr. Paige Green.

Dr. Paige Green: Good morning, everyone. Thank you for joining us today. It is my pleasure to serve as your moderator for this webinar on *Leveraging Cognitive Neuroscience Research to Improve the Assessment of Cancer Research-Related Cognitive Impairment*. Before we begin I want to give you a brief overview of the National Cancer Institute's Division of Cancer Control and Population Sciences. The Funding Opportunity Announcement (FOA) we are going to discuss today has been spearheaded by the National Cancer Institute's Division of Cancer Control and Population Sciences, more specifically, by the Behavioral Research Program (BRP). BRP initiates, supports, and evaluates a comprehensive program of research including basic behavioral and psychological sciences, as well as development testing and dissemination of interventions in cancer control areas, such as tobacco use, diet and energy balance, and sun protection. The mission of the Behavioral Research Program is actually carried out by four distinct branches: the Basic Biobehavioral and Psychological Sciences Branch; the Health Behaviors Research Branch; the Health Communication and Informatics Research Branch; and the Tobacco Control Research Branch.

The main reason why I suspect most of you have joined us today is to find out more about grant opportunities. So I will give you a brief overview of how we actually fund grants [referenced on slide #6]. Most of you may know that our portfolio largely consists of investigator-initiated, or what we call unsolicited grants. But we do support grant applications in specific areas of interest. We normally solicit those applications in the following ways: By request for applications through program announcements (PAs) and through program announcements reviewed with special receipt and referral (PARS). Today we will discuss two FOAs reviewed with special receipt and referral. Before we get into that I would like to give

you a brief overview of the grant mechanisms that we will use for the FOAs we will discuss today [referenced on slide #7].

The first grant mechanism is our NIH research project grant, which is an R01. It is generally used to support a discrete, specified, circumscribed research project. It is the most commonly used grant program. We do not specify a dollar limit unless it is specified in the funding opportunity announcement. R01 grants are generally awarded for a three-to-five-year period of time. This is in contrast to our NIH exploratory development grant mechanism, otherwise referred to as the R21. The R21 mechanism encourages new exploratory and developmental research projects. It is used quite often for pilot and feasibility studies. This particular mechanism is limited to two years of funding, and there is a budget cap. That budget cap is for direct costs over the two-year period, which may not exceed $275,000 in total. Most often preliminary data are generally not required for an R21 application submission.

With that, I would like to turn the discussion over to my colleague, Dr. Jerry Suls, who will present the scientific scope of this particular FOA, *Leveraging the Cognitive Neuroscience Research to Improve the Assessment of Cancer Treatment Related Cognitive Impairment*.

Dr. Jerry Suls: Good morning. I will talk about this particular FOA (there are actually two), to facilitate the use of cognitive neuroscience-informed paradigms to improve assessment of cancer treatment-related cognitive impairment [reference slide #10]. The cognitive complaints are sometimes referred to as “chemobrain” or “chemo-fog.” These refer to a kind of diffuse mental cloudiness reported by some proportion of patients that occurs or follows chemotherapy, sometimes as a very late effect. These cognitive complaints are thought to be due, in part, to the neurotoxic effects of these drugs. Both R01 and R21 FOAs wish to encourage transdisciplinary clinical and preclinical work that will leverage cognitive neuroscience to potentially improve upon conventional measurement of cognitive impairment that follows cancer treatment. We are referring to systemic chemotherapy (although not exclusively), because therapies, such Tamoxifen and Aromatase Inhibitors and molecularly targeted therapies (e.g., monoclonal agents), are also applicable to these FOAs.

Cognitive problems that patients report often include remembering, paying attention, concentrating, following directions, and other complaints. These self-reports by patients are bolstered by empirical studies and also by preclinical (animal) studies in which standard chemotherapy drugs were administered. Approximately one-third of cancer patients and animals who have received chemotherapy agents show deficiencies and lowered performance in cognition, learning, and attention. Right now, the current assessment of chemobrain following cancer treatment – and I should emphasize we are interested in treatment for non-central nervous system malignancies – relies on patient self-reports and traditional clinical neuropsychological test batteries. These kinds of assessments have some limitations, however [reference slide #11]. Patient self-reports are an important first step in assessment and for initial screening because they signal a possible problem. However, self-reports cannot identify the underlying nature of the cognitive impairment(s). The limitation of a patient report is, a patient may report, “I can't remember what I was just told,” and assume that it’s a problem

with memory or recall. But, in fact, it might be that they were unable to pay close attention to what they heard.

Traditional clinical neuropsychological test batteries are a definite improvement, but they, too, have limitations in determining exactly what is not functioning properly with respect to cognitive processing. One example would be the Trail Making Test A [reference slide #12], which is part of the inventories that are used in clinical neuropsychology. In Trails A you connect a bunch of digits in circles and the test administrator measures the accuracy and the amount of time it takes the patient to complete the task. A poor performance could be due to forgetting the digits (memory) and/or their order, trouble searching for the digits (selective attention), or difficulty drawing the lines (psychomotor performance). Other neuropsychological tests also possess this limitation. A poor performance may be due to a number of different things that are not quite going right for the patient. The central issue for us is to understand the source of the cognitive complaint [reference slide #13]; to do that it is important to identify the critical cognitive skills that are working sub-optimally. Lacking a fuller understanding makes it difficult to help patients and clinicians plan accordingly, suggest accommodation strategies, etc.

We think cognitive science tests are capable of better specifying what the underlying impairment is. We also think that cognitive science-based tests have the possibility of being computer-administered, which is unlike traditional clinical neuropsychology testing batteries that are administered one-on-one, and can be very time-consuming. Computer administration might be shorter and more efficient and may even have a potential for being incorporated into testing in the clinic or remotely. I should add there are other tests that have been developed, for example, the NIH Cognitive Toolbox, which was developed to be brief and applicable to a large range of samples.

The limitation of the Cognitive Toolbox tests is, for the most part, they are based on the standard tests in the clinical neuropsychology batteries, OR are based on some cognitive neuroscience-informed tests of the type we're trying to encourage but do not have all the conditions to identify the particular component of cognition that leads to poor performance. For example, the Cambridge Automated Neuropsychology Battery has better sensitivity, but is not composed of all the conditions needed to identify the specific cognitive deficit. An example of a cognitive neuroscience paradigm, which comes closer, is illustrated in slide #14, which we call a filtering task. This comes from Molly Erickson and her colleagues published in 2015. It differentiates between two different components of cognition (selective attention versus memory load) to identify what is responsible for poor performance. This kind of cognitive neuroscience task has not been applied to cancer patients or people getting chemotherapy, but certainly there's no reason to think it couldn't be. The idea here is to remember the number of red items in several different conditions. Sometimes there is a standard set of three. Sometimes there is a standard 3 (red's) +2 (yellow) distractors. Sometimes there are five reds, and then these are taken away. After a short delay, you are supposed to say where the reds are. Why is this important? As indicated, if you manipulate the number of distractors, for example, you add yellows, which are supposed to be irrelevant,

that is testing how well the person can selectively attend (i.e., not be distracted). If you add number of (red) items, that is testing memory-span. By distinguishing these kinds of conditions you should be able to determine whether the selective attention, memory, or both, are responsible for poor performance.

Other tasks that differentiate different components of cognitive skills have also been developed. We think that by using these cognitive neuroscience-informed paradigms we can answer a number of questions. Here are some examples of those questions [reference slide #15]. What specific cognitive functions are impaired following non-CNS chemotherapy treatments (or Tamoxifen, aromatase inhibitors or other molecularly targeted therapies)? Is it selective attention, is it memory, is it long-term memory, is it short-term memory? If one measured either brain activity, or the integrity of neuronal connections, would we find that the cognitive neuroscience testing does a better job at predicting gray and white matter changes after receipt of chemotherapy? Does cognitive neuroscience paradigm performance do better at predicting brain activity or neuronal integrity than performance on traditional clinical neuropsychological test batteries and/or the NIH Toolbox assessment? An important question is how do the cognitive profiles of patients who are treated with chemotherapy differ based on cognitive neuroscience tests versus traditional testing. Might cognitive neuroscience paradigms be more appropriate and efficient for integration into standard cancer care? We also anticipate that if you can identify more precisely what the specific cognitive components that are being affected by chemotherapy are, that can inform strategies for clinical guidelines for effective care plans, for accommodation strategies, and anticipating effects.

What sorts of features do we think grants falling under these FOA's should have [reference slide #16]? First, I will talk about features that are most common to clinical research, that is, studies done with patients who receive chemotherapy. It is essential for those clinical studies to have prospective longitudinal designs. This would be a pre-treatment baseline, which would involve cognitive assessment prior to chemotherapy, and repeated assessment(s) over time. How many assessments, and for how long a period of time would depend on the cancer site and stage, the treatment, the availability of patients, and a variety of concerns that would have to be tailored to the specific aims of the application. But longitudinal design seems essential (certainly in the context of the R01).

Another essential component is incorporation of cognitive neuroscience-informed paradigms or tests to identify what cognitive processes are affected by cancer treatment. And some comparison, probably with traditional clinical neuropsychological assessment tools, to be able to see how well the cognitive neuroscience paradigms work in predicting problems versus to the tests that have been traditionally used. It is also possible for researchers to consider NIH Toolbox or the Cambridge Automated Neuropsychology Battery to compare with cognitive neuroscience paradigms and traditional clinical neuropsychological test batteries and/or patient self-reports. These latter elements are optional, however, because administration time and patient burden can impose significant constraints. The final essential feature is having some relevant comparison group, ideally cancer patients not receiving chemotherapy and/or

healthy aged-matched controls. The choice of control group will depend on the cancer site, cancer stage, and the treatment regimen that the investigators have chosen. Whatever the choice, it is critical that the applicants provide a justification for their choice.

In terms of the other features that are optional [reference slide #17]: structural and/or functional neuroimaging is relevant to some of the example questions – but it is not a requirement. We also think looking at quality-of-life and functional outcomes (as they bear on cognitive effects) as a function of chemotherapy is relevant. Assessing how cognitive neuroscience-informed tests predict such "downstream" outcomes would be very useful, but again, it is an optional feature.

For preclinical (animal) studies, there is more breadth of choice. We do strongly encourage longitudinal designs, however. We also encourage using chemo-agents that are currently being recommended in clinical guidelines and, in particular, thinking about whether a drug-combination or a single drug is going to be tested. There are pros and cons with respect to testing combinations versus testing a single agent at-a-time. A "combo" speaks to generalizability, whereas one agent at-a-time potentially specifies the path of action. In either case, the application should provide a rationale for the choice. Other design features are best justified in terms of the specific aims of the application. There are degrees of freedom in terms of what people do.

What do we think would constitute the criteria for something to be considered really outstanding? [reference slide #18] Certainly the projects would need to demonstrate careful thought about the cognitive neuroscience-based tests chosen to be tested. Especially in cancer patients, is the research able to assess the feasibility and predictive validity of such tests? Is the research capable of indicating whether cognitive neuroscience testing provides more meaningful and useful information about the cognitive functioning of non-CNS cancer patients than does conventional neuropsychological testing? Would the results provide a strong scientific basis to inform care planning and accommodation strategies? We also encourage the inclusion of understudied and demographically diverse samples. Knowledge is limited about the cognitive changes associated with cancer treatment in patients with regard to a broad range of educational backgrounds.

An important criterion is the transdisciplinary nature of the research. It is important for medical oncologists, cancer epidemiologists, clinical neuropsychologists, and psycho-oncologists to include cognitive scientists in this work and collaborate in the development and evaluation of inclusion of these cognitive neuroscience-informed tests. Of course, in the preclinical studies, knowledge and expertise in cancer and extant cancer treatments will be important. There are some things we are **not** intending this FOA to cover. We are not supporting the analysis of existing data. We are discouraging retrospective or cross-sectional research designs (though there may be justification in the case of R21 applications). And including brain imaging technologies exclusively would not be an aim of this FOA.

Another relevant fact is that these two FOAs are PARs [reference slide #19]. They will be evaluated by reviewers with relevant expertise in areas such as cognitive science, oncology, neuroscience, with regard to pre-clinical studies and animal models, and of course, psycho-oncology.

The R01 version of the FOA is the three-to-five-year grant. As Dr. Green mentioned, the R01 usually requires preliminary studies and preliminary data. The R21s are two-year grants. They are considered exploratory and do not usually require preliminary data. For purposes of brevity I will not go through the protocol for grants that request more than $500,000 in direct costs. That will require special program approval for submission. The details about how that works are in the FOA announcement. We urge that everyone read the FOA very carefully before they submit. We tried to include as much of the important information that people needed to know.

The earliest submission date is September 13, 2016 [reference slide #21], but the actual submission deadline is October 13, 2016. There are successive deadlines twice a year. This slide and other information posted on the website indicate when scientific peer review would occur and when these two FOAs expire. There is a slide that indicates other announcements and extramural cancer funding training [reference slide #22]. One thing I want to add is if you decide, “I'm not doing exactly what they want. I am not incorporating cognitive science and informed paradigms. Cognitive assessment is not my a priori goal,” this NCI Branch, Program, and Division strongly encourage the support of all elements relevant to the cognitive effects of cancer treatments. Therefore, certainly consider submitting, though the application may not fall under these PARs. I will let the moderator take over.

Moderator: Thank you, Jerry, for your wonderful presentation. We will open this session for written questions. As a reminder, questions can be submitted using the Q&A feature on the right-hand side of your screen. Just type your question in the provided field, and then hit submit. I will now turn the questions over to Paige Green.

Dr. Paige Green: Thank you, Jerry, for outlining the scientific scope of the funding opportunity announcement to support this very important area of science. The first question that we received is the following: “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 that mean that traditional clinical neuropsychological batteries should not be included?”

Dr. Jerry Suls: The answer is, we think that the traditional batteries, or certainly parts of those batteries, should be included as a comparison to the newer cognitive neuroscience paradigms. That would be one of the comparisons we would think would be critical to determine whether the cognitive science paradigms can do a better job and how.

Dr. Paige Green: Thank you. "To what extent are proposals that focus on both cognitive and social affective changes in response to cancer treatment of interest or are relevant to the FOA?"

Dr. Jerry Suls: Social and affective changes as a function of cancer treatment are not a primary focus of the FOA. However, to the extent it is may be informative to consider social, and particularly, affective changes as a contributor to cognitive impairment, then its measurement may be something that would be looked at favorably. One does not need to look at social and affective changes. It is certainly the case, like in depression, you can see why you might want to measure that and control for it – to determine whether the effect of treatment is "purely a cognitive affect."

Dr. Paige Green: "Must the NIH cognitive toolbox battery be included as a control?"

Dr. Jerry Suls: No. The NIH Cognitive toolbox does not need to be included as a control. It is offered as an option, in part, because of its brevity and ease of administration. If one found that the cognitive neuroscience paradigms performed no better than certain parts of the toolbox, that would be useful information. In any case, researchers do not have to include this toolbox in their applications.

Dr. Paige Green: Do you have any particular preference about the cancer sites that must be studied?

Dr. Jerry Suls: We think there are certain sites that are more relevant to chemo-brain phenomena. The majority of data collected to date are for breast cancer. There are also results on lymphomas and some other sites. But we are not specifically taking a position on any particular site being studied, except it must be a non-CNS malignancy and treated with systemic chemotherapy and/or hormone blocker therapies or molecularly targeted therapies, such as monoclonal agents. I would also say there are some incentives to cancer sites that have not been studied as much as breast cancer.

Dr. Paige Green: Are applications exclusively to be focused on the effects of systemic chemotherapy?

Dr. Jerry Suls: I appreciate that question. Although we anticipate the lion's share of applications will pertain to systemic chemotherapy, the questions about cognitive effects of cancer treatments also pertain to hormone blocker treatments, such as Tamoxifen, Aromatase Inhibitors (AI). We still do not know a great deal about those and their effects on cognition. There are some reports and plausible biological pathways that indicate there are cognitive effects.

People could focus on systemic chemotherapy. They could also look at other forms of treatment including things like the monoclonals, which are also not very well-studied. A given investigator's decision will depend on the availability of the patients and the kind of regimen

that they receive. We expect that drug combinations may be most common. Ideally, of course, one would want to disaggregate the different factors and the different treatments, but that will not always be possible. It will be important for investigators to justify why they have selected certain agents, or why they have selected a combination of drugs to study.

Dr. Paige Green: Certainly we are not restricting a systemic chemotherapy. For early-stage breast cancer patients now there are some suggestions depending on their genetic profile that they may not, in fact, get systemic chemotherapy. After radiation and/or surgery they may immediately go on Aromatase Inhibitors or something like that.

We are going to turn our attention to questions in real time. These are questions that have been submitted by webinar participants as they have listened to the webinar. The first question that we will tackle is the following: "Will grants be reviewed by a SEP or special emphasis panel? If so, will there be human and animal reviewers included in the peer-review group?"

Dr. Jerry Suls: The answer to that question is the grants will be reviewed by a special emphasis panel. There certainly will be strong recommendations to have reviewers with expertise in clinical and preclinical studies. We also anticipate that an SEP will have representation by cognitive scientists, clinical oncologists, psycho-oncologists, clinical neuropsychologists, and animal modelers.

Dr. Paige Green: An applicant can use his or her cover letter to request specific types of expertise that might be needed to ensure an adequate peer review of his or her particular application. As you prepare your application, please make sure that if you believe there is a specific disciplinary perspective that might not be captured by the SRO, you outline that in your cover letter.

Next question: "How concerned should we be about patient burden if we expect applicants to compare traditional neuropsychological and cognitive neuroscience tasks?"

Dr. Jerry Suls: That will depend on the particular goals or aims of an investigator. I would add that some cognitive neuroscience tests can be administered on iPads and perhaps remotely, not in the hospital, for example. Hence, participant burden might be minimized. Because traditional neuropsychological inventories can take more than an hour or so to administer, a couple of testing sessions may be needed. It may be that the sessions are not all in a lab or in a hospital or clinic. There needs to be some attention to these considerations. Participant burden and effects of fatigue are legitimate concerns, but we think they can be strategically overcome.

Dr. Paige Green: "For the determination of near-term versus late-term effects of treatment, is the question of whether the cognitive or cancer-related cognitive impairment is near-term or late-term a required analysis?"

Dr. Jerry Suls: We would encourage long-term or late-term effects assessment, but in some contexts that will not be relevant or possible. It really will depend on the application making clear that meaningful conclusions can be drawn about the effects of treatment based on the follow-up period selected. We suspect that long-term effects are what most patients and clinicians are most concerned about. But the short-term effects, or acute effects, can also be very important for medical treatment, adherence, etc. Assessment of late-term effects would be very appealing, but not absolutely essential. I should add that there is a need for longitudinal data about late cognitive effects in preclinical studies, but whether that is a feasible question will depend on the applicants' specific aims, chemo-agent, the kind of cognitive testing, the species, etc. There will be preclinical studies for which the assessment of late cognitive effects will not be feasible.

Dr. Paige Green: We have a few participants who appear to be interested in whether or not the funding opportunity announcements are relevant to pediatric populations. Can you address that?

Dr. Jerry Suls: We are interested in adult populations. Pediatric populations frequently involve a different set of variables and factors and treatments. Although our division and the branch are clearly interested, these two PARs does not seek to support pediatric or a mix of pediatric and adult. We are talking about adults 18 years and older. Pediatric cases would be a different realm.

Dr. Paige Green: One question we have received highlights that cognitive neuroscience-informed tests largely focus on the computerized assessment of skills that can distinguish selective attention and memory. I do not know if that perception has been perpetrated by the examples that you used in the webinar, but this person would like to know if you can provide examples of cognitive neuroscience tests other than computerized? I would assume ones that are focused on selective attention and memory.

Dr. Jerry Suls: First of all, we do use those examples of computerized tests. I would argue that one could make the case for other sorts of instruments. And in the FOA we make it clear that we're also giving the possibility that one might assess brain activity through a variety of different means (e.g., electrophysiology) to identify impaired cognitive processes. I would say we are thinking most of these neuroscience paradigms will be computerized, but there may be tasks that are much more oriented toward brain activity that is coincident with performing a cognitive task. If someone needs me to amplify on this answer, please contact me.

Dr. Paige Green: That goes for any of the questions that we have attempted to cover today. If you require more follow-up information, please reach out to Dr. Suls.

Next question: "Would biological mechanisms be relevant as part of assessing the cognitive impact of cancer and treatment?"

Dr. Jerry Suls: Absolutely. Identifying mechanisms of action as a function of chemo-agents or hormone blockers, etc., helps to clarify what cognitive process has been impaired. So biological mechanisms and their measurement are definitely relevant. However, not essential for patient studies. Mechanisms are likely to play a major role, however, in the preclinical study applications.

Dr. Paige Green: I would add that was one of the primary reasons why we extended the scope to include preclinical models. We did want to be able to interrogate specific mechanisms in an experimental model.

Someone would like us to clarify the distinction between cognitive science tests and neuropsychological tests. They add, other than test length, how do you clarify or distinguish between those modes of assessment?

Dr. Jerry Suls: In standard clinical neuropsychology tests, with some exceptions, a poor performance on a test often implicates a composite of cognitive operations. So it is difficult to determine exactly where the impairment lies. Cognitive neuroscience paradigms can often probe more deeply about the source of the performance problem. For example, some neuropsychological test batteries can identify that a patient has a problem with memory but not whether it is long-term memory, short-term memory, or working memory, or all three. A well-developed cognitive science test can often differentiate far better than a neuropsychological test battery, which when it tries to differentiate often does require looking at patterns of performance across different tests. The problem is that other factors may vary across the tests. We are not contending, however, that all components of cognition are capable of being dissected, at the current stage of cognitive neuroscience. A good place to find appropriate cognitive neuroscience tests is the consortium called CNTRACS. It has a website, which describes these paradigms for different aspects of cognition and subcomponent processes. There has been some incorporation of cognitive-neuroscience paradigms in functional brain imaging studies but little attempt to test the use of these paradigms for diagnostic purposes.

Dr. Paige Green: May I ask a follow-up question? Is it expected that the cognitive science tests that are proposed in these applications must have already been used in clinical samples of some type, or would more experimental cognitive science tests that might be used in healthy or normative samples be appropriate as well as long as they are scientifically justified?

Dr. Jerry Suls: Absolutely, the answer is the second. Experimental tests are certainly fair game here.

Dr. Paige Green: “Is this funding mechanism appropriate for behavioral experiments in animal models, for examining mechanisms of cognitive impairment with chemotherapy?”

Dr. Jerry Suls: If I understand the question correctly, the answer would be yes, as long as there was an aim and results that bore on whether the procedure could identify a potentially specific component of cognition that is impaired by chemotherapy.

Dr. Paige Green: We have a question that is related to whether a standard battery is expected in preclinical or animal model studies relevant to the FOA?

Dr. Jerry Suls: A standard battery is not expected in preclinical applications. However, it would be critical to justify the use of a cognition, learning, or memory paradigm for animals that is capable of identifying the specific processes that are not functioning properly. The use of a complete battery is not necessary.

Dr. Paige Green: Would you expect that battery or that choice of either behavioral experiments or paradigms that are used in a preclinical model to have some ecological or translational relevance to human processes?

Dr. Jerry Suls: Absolutely. They should have some translational relevance and ecological validity. Generally speaking, in most of the preclinical work that I am aware of, you can almost always find there is evidence for ecological validity. This should be specified in the application, however.

Dr. Paige Green: Perhaps this has been perpetuated by our introduction to the scientific scope, but we have a participant who wants to know whether preclinical studies are actually an emphasis here?

Dr. Jerry Suls: The preclinical studies and clinical studies are both relevant here. We are not emphasizing one over the other.

Dr. Paige Green: I think I have exhausted the list of questions that have been submitted in real time.

Dr. Jerry Suls: There is a question about set-asides. This is not a Request for Applications (RFA). There is no set aside for this. This will be funded from the score percentile from the general pool. However, these are PARs, which means they do get a special review panel with expertise that is relevant to this particular set of questions and areas of research, both clinical and preclinical.

Dr. Paige Green: That is an important point here. The beauty of these two FOAs is they will remain active for a three-year period. That is in contrast to an RFA in which there is one submission time for applicants to respond to this special area of emphasis. We do not have set-asides for this particular scientific activity. But that comes with the ability to submit and resubmit and actually receive a percentile and be considered for funding within the regular funding stream. That is the beauty of this being a program announcement with special receipt and review.

Do you have any closing remarks for our participants?

Dr. Jerry Suls: I want to emphasize something in the FOA and mentioned earlier but probably needs underlining. The FOA is not exclusively concerned with the effects of conventional chemotherapy. We are also interested in effects of other cancer treatments (for non-CNS malignancies), which would include molecularly targeted treatments and also Aromatase inhibitors and tamoxifen. All are relevant because acute and/or late term cognitive effects have been observed with respect to all of these agents to some extent. However, we are not requiring that all agents be studied.

Moderator: There are no further questions. This concludes the webinar today. You will be linked to a feedback form. Please complete that if you have the time. We are open for questions via email, and you will find contact information for Dr. Suls and other program directors on our website. Thank you. You may hang up now.

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