

Most Common Questions about NIH-AREA Grant Applications

Jean Chin

Program Director in Cell Biology and Biophysics
The National Institutes of Health



Dr. Jean Chin of the National Institutes of Health, on the phone — probably with an AREA applicant..

Introduction

The AREA (Academic Research Enhancement Award) program at the NIH (National Institutes of Health) was started in 1985 by Congressional mandate to support research at non-research intensive institutions. These primarily undergraduate institutions have educated about half of the biomedical researchers in the United States. The AREA, or R15 program, is a renewable NIH mechanism for biomedical and behavioral research projects. However, it is not a training or institutional grant. Instead, the R15 is a research grant to support a specific research project developed and proposed by a faculty investigator at an eligible institution.

The goals of the program are to:

- Strengthen the research environment at institutions that are not research intensive;
- Expose students, especially undergraduates, at such institutions to biomedical research; and
- Provide support for meritorious research at these institutions.

In this article, some of the most common questions asked about the AREA application process are addressed. These questions cover issues typically raised in discussions between investigators and program staff at NIH. It is assumed that the faculty investigator will select a significant, novel question or hypothesis and approaches with which to answer the question or test the hypothesis. The questions posed and discussed below include:

1. Would NIH be interested in my research? Which institute would be most appropriate?
2. What makes a strong project? How important is significance, impact, and innovation?
3. How necessary are preliminary data? How much preliminary data should be presented?
4. Why is the abstract important and how is it used?
5. What are the functions of the Specific Aims and Research Design & Methods sections?
6. How is expertise demonstrated by junior or senior faculty investigators?
7. How might junior faculty or senior faculty with new projects be more competitive?
8. What is the purpose of the 3-page Introduction to a revised research proposal?
9. What may be included in the budget request? Are equipment and salaries allowable?
10. How does the R15 differ from research programs at the National Science Foundation?

focus
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Common Problems in NIH Applications

The five review criteria for most NIH grant applications are: significance, approach, innovation, investigator, and environment. Innovation is not necessary, but the results should have compelling significance.

Problems with Significance and Innovation

- Not significant, or exciting, or new research
- Lack of compelling rationale for experiments
- Incremental or low-impact research
- Weak or little biological, biomedical, or behavioral relevance

Problems with Experimental Approach

- Lack of clear, strong hypotheses, or questions, or models
- Too ambitious; too many aims proposed
- Unfocused or unrelated aims; unclear or unintegrated goals
- Limited or narrow aims; not addressing the important questions
- Unnecessary experimental details for standard methods
- Not enough detail on novel methods, or assays, or reagents
- Insufficient or unconvincing preliminary data
- Lack of appropriate controls; data difficult to interpret
- Not directly testing hypothesis — more confirmatory data
- Correlative or descriptive data — fishing expedition
- Experiments not directed towards mechanisms
- No discussion of alternative models or hypotheses
- No discussion of potential pitfalls
- No discussion of data interpretation or future directions

Problems with Investigator

- No/little demonstration of expertise or publications on proposed approaches
- Low productivity; few recent or few primary author papers
- Required collaborators not recruited — letters from collaborators missing

Discussions of the Ten Most Common Questions

1. Would NIH be interested in my research? Which institute would be most appropriate?

A potential R15 applicant or PI (Principal Investigator) should review the "Research Objectives of the NIH Institutes and Centers" in the AREA Program Guidelines. This is a current summary of research topics and interests of each of the 22 funding Institutes and Centers (IC) at NIH accepting AREA proposals. If your research area is appropriate for more than one IC, you might look at the relevant home pages for more specific information.

Once you have determined that your research would be of interest to the NIH, do you have to decide which IC to request assignment to? Actually, you do not. A less proactive strategy is to let the referral officers at CSR (Center for Scientific Review) make the decision, based on your title, abstract, and your cover letter that should be included with your application. This letter should contain a short summary of your research project, including the question to be addressed, the experimental system to be used, and the methods to be proposed. Some research topics are reviewed by more than one review panel, but may be differentiated based on approaches or systems. For example, approaches may be mainly genetic, biophysical, clinical, or computational, while experimental systems may be prokaryotic, eukaryotic, cellular, tissue, or model organisms.

Based on your cover letter and abstract, NIH referral and review staff will also make the review assignment for your proposal. For now, it will be difficult for an investigator and even NIH staff to determine the best study section, because CSR is undergoing a vast reorganization over the next year (for more details, see the CSR home page). Several new study section panels will be added while other panels will be modified with respect to their names, research areas reviewed, and member composition. In addition, assignment to scientific review groups (SRGs) will depend on the number of applications received and the areas of science they propose. Some proposals will be reviewed by standing study section panels that review R01 research or fellowship applications while others will be evaluated in special panels. The cover letter is crucial during this NIH transition.

If you want more assurance that a specific IC is interested in your research, you should contact the NIH staff at the most relevant IC. The list of names and contact information are found on the AREA home page. The best way to avoid phone tag is to send an e-mail message to the IC

contact with a one-to two- page summary of your research project. In the message, include comments about the questions to be addressed and/or model or hypotheses to be tested, the experimental system to be used, the experimental approaches proposed, and the potential significance and impact of the specific research. An email message or attachment may then easily be responded to or forwarded to the appropriate program staff for consideration.

Another way to find out which ICs are interested in your area of research is to search the Computer Retrieval of Information on Scientific Projects (CRISP) database. CRISP contains abstracts from funded NIH proposals and may be searched by research topic, principal investigator name, grant number, institution, state, the funding IC, and the review panel. Each line on the hit list of your search may be selected to retrieve the abstract that contains the above search criteria. By searching on various aspects of your research, you should come up with several potentially interested ICs to consider. A word of caution is needed on the Initial Review Groups listed; because of the current reorganization, some of the name changes have not yet been included. In addition, all the special review panels are listed only as ZRG1, rather than the full study section name.

2. What makes a strong project? How important is significance, impact, and innovation?

A strong proposal should have potential for significant impact! The research should address an important question or test a significant hypothesis. In addition to basic questions or hypotheses, a strong project might develop cutting edge methods, tools, or reagents to answer that important question and to move biomedical research over existing technical impasses. If all the experiments worked, would anyone care about the results? Other scientists should find the results of meritorious proposals interesting, significant, and beneficial.

In a compelling project, the investigator has identified a problem that needs to be done, based on the research literature, the unresolved issues, the gaps in knowledge, and the limitations of current approaches. To get feedback and suggestions early, this applicant will have tested ideas by generating preliminary data and discussed ideas and aims at the outline stage, rather than after the proposal has been written. As a result, this PI has carefully thought through the question/hypothesis, the approaches to be used to address the problem, the potential results, pitfalls, and alternatives, data interpretation, and their impact on the research, both specifically and broadly. Sufficient, quality reagents and powerful, direct methods

Problems with Environment

- Weak demonstration of institutional support — little or no space
- Little or no start-up package — little support for research
- Standard equipment not provided — necessary equipment not available

AREA or R15 Application Receipt, Review, and Award Cycles

Actions on Applications	Cycle I	Cycle II	Cycle III
R15 Application Receipt Dates at CSR*	January 25	May 25	September 25
AIDS-Related applications Receipt	May 1	September 1	January 1
Initial Review by CSR Scientific Review Groups	June-July	October-November	February-March
Secondary Review by IC** Advisory Council	September-October	January-February	May-June
Earliest start date for IC Funding	December-January	April-May	July-August

*CSR: Center for Scientific Review at NIH responsible for the receipt, referral, and review of most applications.

**IC: NIH Institutes and Centers with funding authority and responsibility for consideration and funding of meritorious applications



Funding Institutes and Centers (IC) of the National Institutes of Health (NIH)

NIA	AG	National Institute on Aging
NIAAA	AA	National Institute on Alcohol Abuse and Alcoholism
NIAID	AI	National Institute of Allergy and Infectious Diseases
NIAMS	AR	National Institute of Arthritis and Musculoskeletal and Skin Diseases
NIBIB	EB	National Institute of Biomedical Imaging and Bioengineering
NCI	CA	National Cancer Institute
NICHD	HD	National Institute of Child Health and Human Development
NIDCD	DC	National Institute on Deafness and Other Communication Disorders
NIDCR	DE	National Institute of Dental and Craniofacial Research
NIDDK	DK	National Institute of Diabetes and Digestive and Kidney Disorders
NIDA	DA	National Institute on Drug Abuse
NIHES	ES	National Institute of Environmental Health Sciences
NEI	EY	National Eye Institute
NIGMS	GM	National Institute of General Medical Sciences
NHGRI	HG	National Human Genome Research Institute
NHLBI	HL	National Heart, Lung and Blood Institute
NIMH	MH	National Institute of Mental Health
NINDS	NS	National Institute of Neurological Disorders and Stroke
NINR	NR	National Institute of Nursing Research
NCCAM	AT	National Center for Complementary & Alternative Medicine
NCMHD	MD	National Center on Minority Health and Health Disparities
NCRR	RR	National Center for Research Resources
FIC	TW	Fogarty International Center
NLM	LM	National Library of Medicine

are also in hand, so the researcher can make significant progress on the proposed specific aims.

3. How necessary are preliminary data? How much preliminary data should be presented?

Since one of the goals of the AREA grant mechanism is to support meritorious research at non-research intensive institutions, the R15 grant is a renewable, research grant and not usually considered a mechanism to support the gathering of preliminary data. Although some investigators will use the AREA mechanism to support pilot or feasibility studies, most applicants will submit research projects with preliminary data. If there is none in an application to support the hypothesis proposed and to show appropriate and relevant research expertise of the applicant and collaborators, it may not be competitive.

With respect to how much and what kind of preliminary data are necessary, reviewers want to determine whether the applicant and collaborators, if any, have the appropriate and necessary expertise and whether the reagents and methods proposed are in hand. The kind of preliminary data required depends a lot on the questions or hypotheses you are posing. If you are planning to determine the mechanism of a membrane protein, for example, you should have this protein cloned, expressed in sufficient amounts for the studies, and purified in functional states. If you are searching for an unknown factor, you should have reagents, screens, and assays in hand. Experience with other factors would be helpful. If you find that you really need a lot more preliminary data than you have time or funds for to start the project, perhaps your questions need modifying and backing up. If you need preliminary results from one or two crucial and obvious experiment to support your hypothesis and to make your proposal stronger, just do it!

4. Why is the abstract important and how is it used?

All sections of an NIH application are important, especially to the assigned reviewers, but the sections that are usually read by almost all the reviewers include the abstract and the specific aims page. Along with the cover letter, the referral staff at CSR uses the abstract to determine assignments to NIH ICs and to IRGs (Initial Review Groups) and study section panels. Some applicants assume that NIH applications must include a disease or medical condition in the title or first few lines of the abstract. However, biomedical and behavioral research projects may also include fundamental mechanisms in cell biology, chemistry, and structural biology approaches. After a proposal is funded and with final approval from the investigator, the abstract is included in

the CRISP database of awarded projects. As mentioned above, this database is searchable and helpful to the scientific community in determining what specific research is supported by NIH.

During the evaluation process, the abstract, as a synopsis of the entire proposal, is probably the most important starting point for all reviewers. Before the actual review panel meeting, most of the unassigned reviewers have read or skimmed through the abstract to get an idea of what the application might be about and whether they would be interested in reading further. The three assigned reviewers read the entire application; two of them, the primary and secondary reviewers, submit written comments on each of the five NIH review criteria (significance, approach, innovation, investigator, and environment), as well as an overall evaluation. The third reviewer, the reader, participates in the discussion. If the application is given a score, the Scientific Review Administrator (SRA), who organized the review panel, writes a short resume and summary of discussion to precede the two written critiques of the assigned reviewers. This summary includes the major points brought up by these two assigned reviewers and those brought up by the reader and the rest of the review panel.

Sometimes the points are debated and then clearly resolved in favor or not in favor of the applicant. However, since consensus is not required, issues and concerns sometimes remain unresolved. The scores of the assigned reviewers may range from outstanding to satisfactory, so the rest of the panel must vote according to the strengths of the arguments presented and "vote their conscience." During these discussions, reviewers not assigned to the application in question may look at the abstracts, specific aims, and relevant sections to help them resolve how they will score. Sometimes unassigned reviewers can argue for or against the application because they have additional insight or can point out information in the application for resolving the issues. Since the abstract may be the one section that most of the unassigned reviewers have read, the applicant should certainly want to submit a clear and strong abstract to help the all the reviewers understand and support the significance and specific aims of the proposal.

5. What are the functions of the Specific Aims and Research Design and Methods sections?

The Specific Aims section is a one-page summary of what the questions, goals, or hypotheses are and the methods for how you are going to answer those questions, accomplish those goals, or test those hypotheses. Significance and impact should be clearly stated in an introductory or

The Four Divisions and 25 Initial Review Groups (IRG) of the Center for Scientific Review (CSR) at NIH

Division of Molecular and Cellular Mechanisms

- Biochemical Sciences (BCS)
- Biology of Development and Aging (BDA)
- Biophysical and Chemical Sciences (BPC)
- Bioengineering Sciences and Technologies (BST)
- Cell Development and Function (CDF)
- Genetic Sciences (GNS)
- Molecular, Cellular, and Developmental Neuroscience (MDCN)

Division of Biological Basis of Disease

- AIDS and Related Research (AARR)
- Endocrinology and Reproductive Sciences (ENR)
- Immunological Sciences (IMM)
- Infectious Diseases and Microbiology (IDM)
- Nutritional and Metabolic Sciences (NMS)
- Oncological Sciences (ONC)

Division of Physiological Systems

- Cardiovascular Sciences (CVS)
- Digestive Sciences (DIG)
- Hematology (HEME)
- Integrative, Functional, and Cognitive Neuroscience (IFCN)
- Musculoskeletal, Oral and Skin Sciences (MOSS)
- Respiratory Sciences (RES)
- Renal and Urological Sciences (RUS)

Division of Clinical and Population-based Studies

- Biobehavioral and Behavioral Processes (BBBP)
- Brain Disorders and Clinical Neuroscience (BDCN)
- Health of the Population (HOP)
- Risk, Prevention and Health Behavior (RPHB)
- Surgery, Radiology and Bioengineering (SRB)

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Useful Websites for NIH AREA Applicants

General NIH and AREA Information

NIH Home Page

<http://www.nih.gov>

AREA or R15 for Non-Research Intensive Colleges and Universities

<http://grants.nih.gov/grants/funding/area.htm>
(Includes FAQ, Ineligibility List, NIH Contacts, R15 Grants, Success Rates)

The Funding Components of NIH (Institutes & Centers or IC)

<http://www.nih.gov/icd/>

Research Objectives of the NIH Institutes and Centers in AREA PA-03-053 on AREA Home Page

<http://grants.nih.gov/grants/guide/pa-files/PA-03-053.html>

CRISP Database for Funded Research Project Abstracts

<http://crisp.cit.nih.gov/>

The Application Process

Grant Writing Tips (especially Quick Guide for Grant Applications)

http://grants.nih.gov/grants/grant_tips.htm

Answers to Frequently Asked Questions about NIH Grants

<http://grants.nih.gov/grants/funding/giofaq.htm>

NIH Grant Application (PHS 398) Instructions/Guidelines and Forms

<http://grants.nih.gov/grants/forms.htm>

NIH Modular Grant Information, Q&A, Sample Budget and Biosketch

<http://grants.nih.gov/grants/funding/modular/modular.htm>

Application Receipt, Referral and Review

<http://grants.nih.gov/grants/funding/submissionschedule.htm>

final paragraph. The order of the aims should reflect the order of research priority so the first aim should not be a weak one with little preliminary data or with lower impact. Aims that are riskier but still exciting and innovative may be placed last or later.

To make your proposal easier and clearer for the reviewers to follow, please remember to prioritize the specific aims. In the Research Design and Methods section, restate the specific aim and use the priority order to address the specific aims. If there is more than one part to an aim, use subheadings, so the reviewers understand you are still focusing on the same aim. Sometimes applicants misunderstand the role of the Research Design and Methods section and merely provide a list of the proposed methods and experiments. However, for each specific aim, you should discuss the rationale, the proposed experiments and methods to address that aim, their pitfalls and alternatives, the significance of potential data, and future directions. There should be an integration of the specific aim with the proposed approaches.

In weaker applications, the specific aims do not appear to correlate with the approaches discussed. For example, if an application lists four specific aims on the first page of the research proposal but includes six approaches later, it is not clear which approach is for what aim. Because this is very confusing and frustrating to reviewers, such proposals may be considered disorganized and unfocused. Make it easy for reviewers to understand and follow the order and logic of your original specific aims. Keep the Specific Aims page framework for the Research Design and Methods, the most important section of the proposal, and keep the five NIH review criteria in mind as you prepare this section. Remember that this is a prospective look at what you want to do, what might happen, and what impact the result might have. In contrast, publications are retrospective and summarize the question posed, the results, and the conclusions.

6. How is scientific expertise shown by faculty investigators?

Scientific expertise is normally demonstrated by publications in the research area, and by essential and convincing preliminary data using the approach or method proposed. If the applicant is continuing an aspect of a postdoctoral or graduate student project, results from published papers and current experiments, both included in the Preliminary Data or Progress Report section, are evidence of expertise in those areas. However, if the project is a change in direction for the applicant, recent preliminary data and collaborations may be crucial.

In these days of multidisciplinary research, it is difficult for one investigator to master all approaches, so some projects may include collaborative arrangements, advisory consultants, or methods and reagents sharing. For any of these situations, applicants should request and include letters from their collaborators and consultants indicating their commitment to the research project, their role in the project, and what they will do. Inclusion of a biosketch of the collaborators and consultants showing relevant publications and expertise in the research approach and area may also be helpful.

One caveat to recruiting experts in other areas is that the applicant investigators must establish that they are in charge of the project and that the collaborators are only assisting in their projects. This is an especially critical issue when the AREA applicant is collaborating with a former mentor or advisor. In this case, the letter of collaboration from the mentors/advisors should clearly indicate that the project is not being pursued in the senior investigators' laboratories and that they are only providing assistance with specific assays, approaches, and/or reagents for the applicant's project.

7. How might junior faculty or senior faculty with new projects be more competitive?

Despite pressures from deans and chairs to submit NIH applications as soon as possible and even before arriving at the AREA-eligible institution, new investigators should not be pushed or rush to do so. Since 1997 when the five NIH review criteria, including Environment, were established, reviewers have been interested to see how the new investigator functions where the research will actually be done. Is there institutional support for the research? Are the facilities and resources adequate to pursue the specific aims?

New investigators, therefore, are encouraged to set up their labs and generate some preliminary data with the students and resources available in the non-research-intensive institution. Most novice applicants submit over-ambitious proposals, partly because they may underestimate their other responsibilities, partly because they assume that they will be as productive as when they were postdoctoral fellows, and partly because they have terrific enthusiasm for their research. Some are from research-intensive universities where teaching was not required or minimally so, but most AREA-eligible institutions require significant teaching. Instead of having access to the more senior research staff normally found in research-intensive institutions, new faculty members at

The Review Process

The Five Review Criteria for Most NIH applications

<http://grants.nih.gov/grants/guide/notice-files/not97-010.html>

NIH Center for Scientific Review Study Section Roster and Scientific Areas Index

<http://www.csr.nih.gov/committees/rosterindex.asp>

Special Programs at NIH

SBIR/STTR Homepage

<http://grants.nih.gov/grants/funding/sbir.htm>

Small Grant Program or R03 (only NCI, NIAAA, NIAID, NICHD, NIDCR, NIDDK, NIMH, NIA, NIDCD, NIDA, NEI)

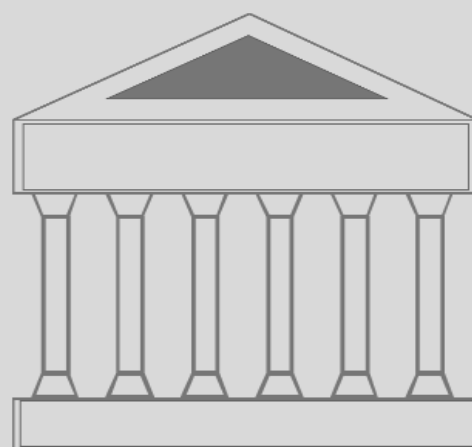
<http://grants2.nih.gov/grants/funding/r03.htm>

Minority Programs at NIH and at NIH Institutes and Centers

<http://grants.nih.gov/grants/policy/emprograms/overview/minority.htm>

Minority Opportunities in Research (MORE Division in NIGMS)

http://www.nigms.nih.gov/about_nigms/more.html



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AREA-eligible institutions usually can only recruit undergraduate or masters-level students. With these collaborators, more time is needed to generate the required preliminary data. Reviewers would like to see realistic goals and enough preliminary data to indicate that the project is significant and feasible in the specific, new environment. In this manner, new investigators can highlight their preliminary data and experience working with undergraduates. Any experiences the applicant had in supervising undergraduates as graduate students and/or postdoctoral fellows may be added to the Biosketch and, if relevant, to the Preliminary Data as well as Research Design sections.

More senior faculty with new projects might be more competitive if expertise in that research area can be demonstrated. Sometimes there is a change in research focus because of a productive sabbatical, a new collaboration, or a completed project. Publications are the easiest way to show the new expertise, but strong preliminary data are the most useful. Adding a consultant or collaborator who is an expert in the new research area and including a strong letter indicating their role in your project would also be very helpful and useful.

8. What is the purpose of the three-page Introduction to a revised research proposal?

Since about two-thirds of the applications in a round are not funded, most applicants will have to revise and resubmit their proposals. The purpose of the Introduction is to summarize, for the next set of reviewers, the applicant's responses to previous critiques. Although the revised application may or may not be reviewed by the previous study section panel, the previous summary statement will be provided to the next assigned reviewers. Based on the previous comments, the introduction, and the revised proposal, they will determine if the PI has been responsive to the previous critiques and whether the proposal has improved, not changed, or gotten worse, relative to the other applications reviewed in that cycle.

Basically, the Introduction is a roadmap for what changes were made, where the changes are, and what progress has been made since the previous submission. Answers to specific questions should be answered briefly in the Introduction and elaborated on in the appropriate section of the proposal. Because issues raised during the discussion may not have been pointed out in the critiques of the primary and secondary reviewers, it is important that the applicant also address the comments found in the Resume and Summary of Discussion section.

With input from colleagues and NIH program staff, the applicant should understand the previous comments and

address them fully and convincingly in an amended proposal. Surprisingly, some applicants revise and resubmit without substantive changes, without answering questions the previous reviewers had, and/or without commenting on the suggestions made by some reviewers. Not surprisingly, superficial responses are not a good idea, since such revisions may receive even worse scores than the previous proposal.

9. What may be included in the budget request? Are equipment and salaries allowable?

In general, the budget request should be reasonable, strongly rationalized with respect to the proposed aims, and well thought out. Personnel should be well justified with respect to their percent effort and roles in the specific aims of the proposal. The AREA grant has a limit of \$150,000 direct cost plus facilities and administrative (F&A) costs spread out over one, two, or three years. How many years will depend on how much time an investigator has to spend on a research project. Most applicants request three years at \$50,000 direct costs each year, whereas a few request two years at \$75,000 direct cost per year. If an investigator finds that more time is needed to complete the research aims or to spend the awarded funds, about two to three months before the termination of the AREA grant ends, a no-cost extension of up to a year may be requested from your sponsored research office, which will then inform the funding NIH institute of the extension approval.

After an award is made, there are two exceptions to the AREA cap of \$150,000 direct costs. If there is at least one year left on the active grant, the faculty investigator may awarded an administrative supplement for exposing underrepresented minority high school or undergraduate students and students with disabilities to meritorious research. Faculty members who have recruited eligible students should contact NIH program staff or look at the AREA Program Guidelines.

Budget requests will depend on whether investigators at AREA-eligible institutions are on nine- or 12-month salary contracts. Faculty on nine-month contracts may request three months of summer salary for themselves and for students. Those on 12-month contracts may request salary for students and/or partial salary for other laboratory personnel. However, since exposing undergraduates to meritorious research is one of the three goals of the AREA program, if possible, applications should include summer salary and sometimes part-time, academic year salary for at least one undergraduate student. To most reviewers, the inclusion of students and their salary, although not required, may indicate the investigator's commitment to undergraduate research.

Equipment required to address the specific aims of a proposal is also an allowable budget request, but an applicant should determine whether the equipment requested should have been provided by a junior faculty's start-up funds or by the department. If the instrument is fairly standard, reviewers would question why this was not part of the normal laboratory set up. If, however, the equipment is specialized and specific to the investigator's research, it may be acceptable, especially if there are none or few available locally or if the project requires significant access. Most equipment, usually one to two modules or approximately \$50,000 and less, is requested in the first year of the proposal. There needs to be a strong justification in the budget section for how it will be used to address the specific aims. On the other hand, if the equipment is very expensive and if the request would overwhelm the AREA budget, the institution might provide cost-sharing funds. Although not required, reviewers may see this cost sharing as strong evidence for institutional support and commitment to the applicant's research.

10. How does the R15 differ from research programs at the National Science Foundation?

First, NIH separates the review role from the funding role whereas the professional staff at NSF performs both review and funding functions. The SRA (Scientific Review Administrator) at NIH recruits reviewers, makes review assignments, organizes the study section meeting, and prepares the summary statement (critiques or pink sheets). The PD/PO (Program Director or Program Officer) answers questions about NIH research interests, submissions or revisions, attends the study section meetings, makes funding recommendations, and administers the funded grants. With respect to evaluations, NIH study sections give numerical scores while NSF panels places proposals in categories such as Excellent, Very Good, Good, and Poor.

The second significant difference is that, while NSF does not have a formal "revised application" such as the NIH A1 or A2 for first amended or second amended application, both NIH and NSF accept revised applications for review and for funding consideration. At NSF, the proposal number changes, but the professional staff and reviewers may treat the application as a revision. In addition, NSF has no limit on the number of "revisions" it will accept.

At NIH, in contrast, the proposal number of a revision does not change, but the addition of an A1 or A2 indicates an amended application. In addition, NIH only accepts up to two amended versions of the same project. After that, a new or substantially different project should be submitted. The continuity between the original and the

revised application is provided by the written comments of the summary statement. Reviewers of revised applications receive not only the revised application but also the previous summary statement and are asked to evaluate whether the applicant has responded to the previous critiques and whether the proposal has improved or not.

Final Comments

Hopefully, these discussions have been helpful and will convince potential applicants to develop a biomedical or behavioral project for submission to the NIH. Faculty investigators at AREA-eligible, non-research intensive institutions have contributed so much to the scientific community by doing meritorious research, by exciting undergraduate students with hands-on research, by encouraging them to pursue advanced degrees, and by providing research experiences to half of the active scientists in this country.

NIH is extremely enthusiastic about the AREA program and hopes that investigators will show their interest in biomedical research and support for the program by submitting R15 applications. On the AREA home page, the table summarizing the success rates for AREA applications, FY 1985-2002 indicates that approximately 30% of applicants are awarded an R15 each year! This good news is tempered, unfortunately, by the fact that the number of total R15 applications received has been decreasing over the past several years. For NIH to increase the funding of the AREA program, the AREA-eligible institutions and investigators need to show their interests by submitting more R15 applications.

Dr. Jean Chin has been a Program Director in the Division of Cell Biology and Biophysics at the National Institute of General Medical Sciences (NIGMS) of the National Institutes of Health (NIH) since 1994. She oversees a portfolio of over 200 research grants in the areas of membrane structure & function, lipid metabolism, and viral assembly. After receiving her B.S. in Chemistry from Simmons College and her Ph.D. in Biochemistry from Dartmouth College, she held postdoctoral and junior faculty positions at Harvard University and Harvard Medical School. Dr. Chin has been an advocate of the AREA or Academic Research Enhancement Award program at NIH and has served on the NIH committees that were responsible for the improvements to the AREA program over the past several years. This NIH program supports biomedical and behavioral research in non-research intensive institutions and exposes undergraduates to meritorious research.

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successful NIH-AREA grant proposals