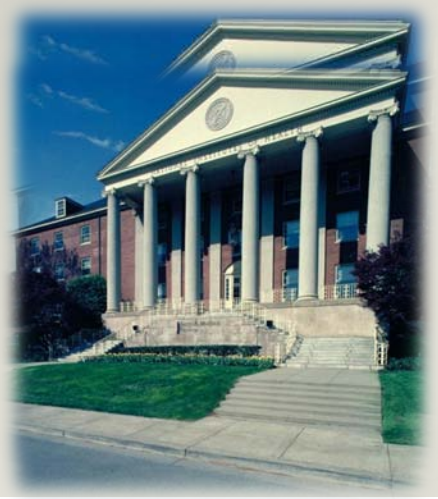


Writing a Successful Career (K) Application

Indianapolis, April 2012

Name: Henry Khachaturian, Ph.D.
Title: Extramural Program Policy Officer
Office: Office of Extramural Programs

NIH Grant Process

1. Great Idea

2. Consult With Others

3. Write an Organized Proposal

4. Understand Review

Details of the NIH Review Process

My Application

PI / Institution Submits application

Center for Scientific Review

Assigns IRG in CSR or IC

Scientific Review Group

Evaluates Scientific Merit

Institute or Center

Evaluates Relevance

Advisory Council

Recommends Action

IC Director

Allocates Funds

$$$

$$$

Revision / Resubmission

Conduct Research

Scientific Review Groups or Study Section

- A Scientific Review Group (SRG) typically has 12-24 members.
- 3 face-to-face meetings each year.
- Review 60 – 100 applications at each meeting.

Timeline for K Applications

Receipt/Due Date:

- Feb 12 (Mar 12)
- Jun 12 (Jul 12)
- Oct 12 (Nov 12)

Scientific Review:

- Jun/July
- Oct/Nov
- Feb/Mar

Council Review:

- October
- January
- May

Earliest Award Date:

- December
- April
- July

Steps for Planning & Writing an Application

1. Develop a Strategy for Planning a K Grant
2. Stay Informed: Read NIH Guide for Grants & Contracts
3. Start Early to Apply Electronically
4. Before You Start Writing
5. Develop a Solid Hypothesis
6. Plan Your Application
7. Request an Appropriate Budget
8. Don't Propose Too Much
9. A Few Tips as You Write
10. Write a Compelling Application

Don’t Forget the Career Development Award Review Criteria!

Develop a Strategy

- **Assess your career situation and needs. Find out the opportunities for collaborating with a known laboratory and experienced mentor(s) and collaborators.**
- **Asses the field and the competition; see which other projects in your field are being funded by NIH. Search the NIH database: Research Portfolio Online Reporting Tools (*RePORT*).**
- **Evaluate yourself: What are your strengths and weaknesses? Can you capitalize on your expertise and fill in any gaps with collaborators or consultants?**
- **Find out what resources and support your organization has and what additional support you will need.**

Develop a Strategy

- **Is there an added value to your receiving a K award? Why not pursue research training through other mechanisms?**
- **Give yourself plenty of time to write the application, probably three to six months.**
- **Know your organization's key contacts and internal procedures for electronic application.**
- **Begin the application by writing a one-sentence hypothesis for the proposed research project.**
- **Call an Institute/Center (I/C) Program Officer for an opinion of your ideas. See if your ideas match any of the I/C's high-priority areas, reflected in I/C's initiatives and concepts.**

Stay Informed

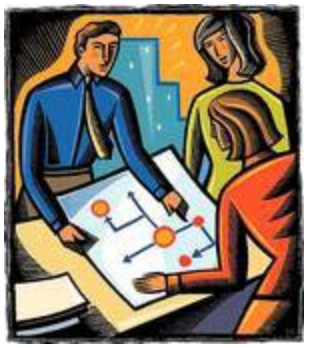
- Read NIH Guide notices.
- Read the NIH Institute/Center Funding Opportunity Announcements.
- Sign up for NIH's Electronic Application Listserv to Receive News and Updates.
- See NIH's Electronic Submission Website.
- As you plan your grant, watch for important policy and process changes.
- Be wary of online information – always check when a page was last updated.

Start Early to Apply Electronically

- The general rule of thumb for a K award is to start at least 3 months prior to the application due date.
- Notify your referees early on and give them plenty of time to submit letters of reference.
- At least a month before you want to apply, you'll need to get an NIH Commons account.
- You will also need to know who is your organization's Authorized Organizational Representative (AOR). Your AOR is typically someone in your business office.
- Only the AOR can submit your application to Grants.gov. Keep in mind that your organization is the "applicant." You are the K candidate.
- For info, see: http://era.nih.gov/ElectronicReceipt/process.htm

Before You Start Writing

- **Coordinate the application with your mentor's schedule. Remember that a K application is a collaboration between you and your mentor.**
- **As you write the research project, always keep in mind the impact on your career development plans and progression.**
- **Make sure your planning and feedback are adequate by putting together your own review committee.**
- **After you've settled on a project, draft a short description of your specific aims and discuss these with the committee.**
- **Be sure to have the committee review the application after you're finished writing.**



Develop a Solid Hypothesis

- **The research component of a K application should be driven by strong hypotheses rather than advances in technology.**
- **The hypothesis is the foundation, or the conceptual underpinning on which the entire project rests.**
- **Generally applications should ask questions that prove or disprove a hypothesis rather than use a method to search for a problem or simply collect information.**
- **However, sometimes applied research is also important to discover basic biology or develop or use a new technology.**
- **You should develop a focused hypothesis that increases understanding of an important biologic process and is based on previous research.**

Develop a Solid Hypothesis

- **Examples of a poor research hypothesis:**
  - ***Analogs to chemokine receptors can be biologically useful.***

    Problem: Too broad! Searching for a potential biological application.
  - ***A wide range of molecules can inhibit HIV infection.***

    Problem: Fishing expedition! Searching for a solution to a biological problem by throwing darts.
- **Example of a good research hypothesis:**
  - ***Analogs to chemokine receptors can inhibit HIV infection.***

Develop a Solid Hypothesis

A few Tips:

- **Make sure your idea is not too broad. Your hypothesis must be provable during your 3 to 5 year award with the level of resources you are requesting.**
- **Your topic should fit NIH's public health mission. Tie your science to curing, treating, or preventing disease.**
- **Show reviewers how your project fits in your field. Make this explicit.**
- **Remember, methods are the means for performing your experiments. Your experimental results will prove or disprove your hypothesis.**
- **If you have more than one hypothesis, choose the better one.**

Plan Your Application

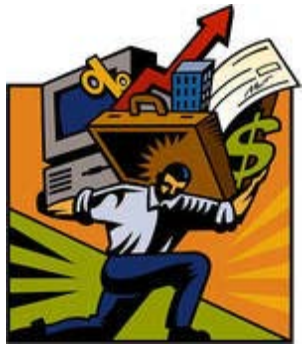
- **Make sure your hypothesis will generate aims and methods you can accomplish within the 3-5 years time and with the resources available.**
- **After you have chosen your hypothesis, outline your specific aims:**
  - **List your aims and then all the experiments you will do to support each aim.**
  - **Keep in mind that your experiments support your aims, and your aims support your hypothesis.**
- **Use graphics to plan experiments.**
  - **Chart experiments with decision trees showing alternative pathways should you get negative results.**

Request an Appropriate Budget

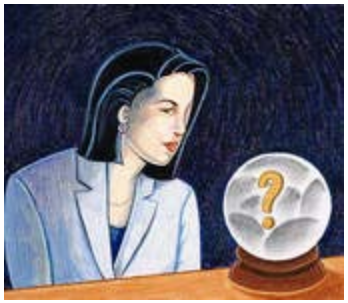
- The Career (K) line budget is driven by NIH Institute and Center policies. As an applicant, you are restricted to what you can ask for.
- Be aware that the NIH Institutes and Centers have varying salary and research cost scales!
- A typical mentored K award to a new investigator provides partial salary and only modest research costs.
- Ideally, your mentor(s) should be well-funded (NIH funding is preferred), and funding from the K is supplemental to his/her research funds.
- Most independent K awards do not provide research costs. It is expected that you will have peer-reviewed research funding.

Don't Propose Too Much

- **Sharpen the focus of your application. Beginning applicants, particularly at an early career stage, often overshoot their mark by proposing too much. Avoid an "over-ambitious" project or one that looks a lot like an R01 grant!**
- **Your hypothesis should be provable and aims doable with the resources you are requesting.**
- **Make sure the scale of your hypothesis and aims fits your request of time and resources.**
- **Reviewers will quickly pick up on how well matched your research and career development objectives are.**



A Few Tips as You Write



Write to Your Audience:

- **Organize your application so the reviewers can readily grasp and explain what you are proposing, and most importantly, why you should get a K award.**

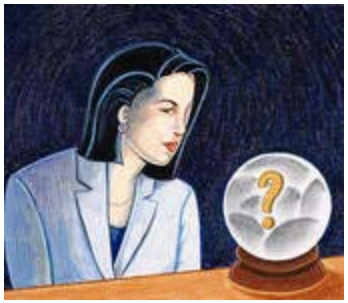
Be Persuasive:

- **Tell reviewers why testing your hypothesis is worth NIH's money, why you are the person to do it, and how your mentor(s) and institution can give you the support you'll need to get it done.**

Balance the Technical and Non-technical:

- **Keep the abstract, significance, and specific aims non-technical, and get technical and detailed only in the methods section.**

A Few Tips as You Write



Make Life Easy for Reviewers:

- Write clearly and concisely
- Guide the reviewers with graphics as much as possible
- Label all materials clearly
- Edit and proof

Know These Review Problems and Solutions:

- Write a compelling argument for why your career will be enhanced by receiving a K award
- Write to the non-expert in the field

Write a Compelling Application

- **Candidate Qualifications, Career Goals, Training Plans**
- **Statements by the Mentor, co-Mentors, Collaborators, and Consultants**
- **Institution Environment and Commitment to the Candidate**
- **Specific Aims**
- **Research Strategy**

Candidate's Qualifications

Biographical Sketch:

- **Personal Statement: Your research experience and other qualifications for this K award.**
- **Research Support: Your/colleagues accomplishments attesting to qualifications of the research team. Don't confuse this with "Other Support."**

Candidate's Background:

- **Coordinate with information in the Biographical Sketch, e.g., research and/or clinical training experience that has prepared you for the K.**

Candidate's Career Goals

Career Goals and Objectives:

- **Tell the reviewers about your scientific history, and how the K award fits into you research career development plans.**
- **If you have changed research direction, discuss reasons for the change, and be sure to justify how it will help you to develop your research career.**
- **You should always provide a career development timeline, including plans to apply for subsequent grant support.**

Candidate's Career Plans

Career Development/Training During Award:

- Make sure to fully explain any new or enhanced research skills you will gain as a result of the K.
- Stress activities that will enhance your research career, e.g., courses, techniques.
- Describe any additional, non-research activities in which you expect to participate. Explain how the activity is related to your research and career development plans.

Responsible Conduct of Research

Training in Responsible Conduct of Research:

- **Document any prior participation in RCR training and/or propose plans to receive additional instruction.**
- **Discuss the five components outlined in the NIH Policy: Format, Subject Matter, Faculty Participation, Duration, and Frequency.**
- **Is the plan appropriate for your career stage, and will it enhance your understanding of ethical issues related to research?**

Mentor(s), Collaborators, Consultants

Statements by Mentor(s), Consultant(s):

- **Each mentor must explain how he/she will contribute to the development of the candidate's research career.**
- **Discuss the research And Also other activities, e.g., seminars, scientific meetings, training in RCR, publications and presentations.**
- **Document the sources and amounts of anticipated support for the candidate's research project.**

Mentor(s), Collaborators, Consultants

Statements by Mentor(s), Consultant(s):

- **Provide details on the candidate's anticipated teaching load, clinical responsibilities, etc.**
- **It is critical to discuss plans for transitioning the candidate to the independent investigator stage by the end of the K award period.**
- **Mentor(s) must provide details for any previous experience as a mentor, types (e.g., graduate students, Postdocs), numbers, and career outcomes.**

Institution's Research Environment

Description of Institutional Environment:

- The sponsoring institution must document a strong, well-established research program related to the candidate's areas of interest.
- The statement should include the names of the mentor(s) and other relevant faculty.
- The statement should provide details of facilities and resources available for the candidate.
- Any opportunities for intellectual interactions, e.g., journal clubs, seminars, and presentations?

Institution's Commitment

Institutional Commitment to the Candidate:

- **The institution must document its commitment to the candidate's career development independent of the K award!**
- **The institution must agree to provide adequate time and support to the candidate for the period of K.**
- **Provide documentation for the institution's commitment to the development and advancement of the candidate during the period of the K award.**

Institution's Commitment

Institutional Commitment to the Candidate:

- **The institution must provide the candidate with appropriate office and laboratory space, equipment, and other resources and facilities (e.g., access to clinical and/or other research populations) to carry out the proposed research.**
- **The institution must provide appropriate time and support for any proposed mentor(s) and/or other staff consistent with the career development plan.**

Specific Aims of the Project

Specific Aims:

- **Each aim should be stated separately followed by a brief discussion of expected outcomes and their impact on the research field.**
- **Provide a clear statement of each aim's objectives, e.g., to test a stated hypothesis; to create a novel design; to solve a specific problem; to challenge an existing paradigm; to address a critical barrier to progress in the field; or to develop new technology.**

Research Strategy

Research Strategy: Significance

- **Be sure to provide an explanation of the importance of the problem you are trying to study.**
- **Explain how your proposed study will improve scientific knowledge, technical capability, or clinical practice in one or more fields.**
- **Discuss how existing concepts, methods, technologies, treatments, or interventions may be impacted if the proposed aims are achieved.**

Research Strategy

Research Strategy: Innovation

- **Be sure to provide an explanation on how your proposed research project may challenge current research or clinical practice paradigms.**
- **Describe and fully discuss any novel theoretical concepts, approaches, methodologies, or interventions that may be developed or used.**
- **Describe any advantage over existing approaches, methodologies, instrumentation, or interventions?**

Research Strategy

Research Strategy: Approach

- Here is where you need to describe and discuss the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project.
- Be sure to also discuss any potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims.
- If the project is in the early stages of development, describe strategies to establish feasibility and manage high-risk aspects of the proposed work.

Career Award Review Criteria

- **Overall Impact:** This score reflects the reviewers assessment of the likelihood for the candidate to become/remain an independent investigator. An application does not need to be strong in all categories to have a major impact.
- **Scored Review Criteria:** Determination of scientific, technical, and career merit. Each gets a separate score:
  - Candidate
  - Career Development Plan/Career Goals & Objectives
  - Research Plan
  - Mentor(s), Consultants(s), Collaborator(s).
  - Environment and Institutional Commitment to the Candidate

Career Award Review Criteria

Candidate:

- Quality of research, academic and/or clinical record
- Potential to develop as an independent and productive researcher
- Commitment to a research career
- Quality of the letters of reference

Career Development Plan/Career Goals & Objectives:

- Likelihood that plan will contribute substantially to the scientific development of candidate – Added Value
- Content, scope, phasing, and duration of the plan in the context of prior experience and stated career objectives

Career Award Review Criteria

Research Plan:

- **Scientific and technical merit of the research question, design and methodology**
- **Relevance of the proposed research to the candidate‘s career objectives**
- **Appropriateness of the research plan to the stage of research development and as a vehicle for developing the research skills described in the career development plan**

Career Award Review Criteria

Mentor(s), Consultants(s), Collaborator(s):

- Qualifications and statement by Mentor and collaborators/Consultants

Environment and Institutional Commitment to the Candidate:

- Commitment of institution to ensure that the candidate's effort will be devoted to research (Minimum 75%)
- Adequacy of research facilities and training opportunities, including capable faculty
- Assurance that institution intends for the candidate to be an integral part of its research program

Career Award Review Criteria

Additional Review Criteria:

- **Protection of Human Subjects from Research Risk**
- **Inclusion of Women, Minorities, and Children in Research**
- **Care and Use of Vertebrate Animals in Research**
- **Biohazards**
- **Resubmission Applications**
- **Renewal Applications (as applicable)**

Additional Review Considerations:

- **Training in the Responsible Conduct of Research**
- **Select Agents**
- **Resource Sharing Plans**
- **Budget and Period of Support**

Useful NIH Websites

- **NIH Institutes and Centers: http://www.nih.gov/icd/**
- **Grants and Funding Opportunities: http://grants1.nih.gov/grants/**
- **Research Training Opportunities: http://grants1.nih.gov/training/index.htm**
- **Forms and Applications: http://grants1.nih.gov/grants/forms.htm**
- **Electronic Submission of Applications: http://era.nih.gov/ElectronicReceipt/**
- **Grants Policy and Guidelines: http://grants1.nih.gov/grants/policy/policy.htm**
- **NIH Guide for Grants and Contracts (the NIH Guide) http://www.nih.gov/grants/guide/index.html**