

# Obtaining Research Support: Grant Funding Mechanisms

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# Learning Objectives

1. Identify sources of research funds and types of funding mechanisms.
2. Provide an overview of the grant review process.
3. Introduce principles of good grant writing.

# Traits of a Successful Grant Getter

- Research skills
- Salesmanship skills
- Communication skills
- Ingenuity and flexibility
- Administrative skills
- Human relations
- Persistence, dedication, patience
- Ability to work hard
- Political awareness and action
- Integrity

Successful grant writing is a mixture of:

Good Science

Good Communication

Good Marketing



# Types of Research Funding

Purpose

Source

Requirements

# Research Funding by Purpose of Support

Research Projects

Research-related contracts

Cooperative agreements

Training awards

Research supplement awards for underrepresented minorities

Research facilities construction and repair, renovation and modification grants

# Types of Research Grants

- Research project grants (R01)
- Small grant awards (R03)
- Program project grants (PPG)
- Center grants
- Small business innovation research grants (SBIR)
- Method to extend research in time (MERIT) award
- Education projects (e.g. Academic Awards)
- Conference grants

# Training Awards

## National Research Service Awards (NRSA)

- Short term research training grants
- Institutional training grants (e.g. T32)
- Individual predoctoral fellowship awards
- Individual postdoctoral fellowship awards
- Research career development awards (K awards)
- Senior fellowships
- Fogarty International Fellowships

# Research Career Development Awards (RCDA)

K01 – Mentored Research Scientist Development Award

K08 – Mentored Clinical Scientist  
Development Award

K23 – Mentored Patient-Oriented Research Career  
Development Award

Other K Awards specific to NIH Institutes

(K99/ROO, K07, etc.) or Program (Roadmap K12)

## Goals of RCDA

- Provide training needed for a research career
- Support career development activities
- Protect time and effort for persons in early stages of research career (usually instructor or assistant professor)

## **Eligibility for RCDA**

- Doctorate degree. For clinical research, MD, DO, DDS, doctorally prepared nurse, or PhD in clinically related sciences (e.g. behavioral science, nutrition, exercise physiology, etc.)
- U.S. citizen or permanent resident
- Should not have received prior NIH research grant (R01) in RCDA
- Willing and able to commit 75% effort
- Call NIH Institute contact person for clarification of eligibility

## Career Development Support Available from a K Award

- Stipend (Salary Plus Fringe) usually up to \$75,000 per year, for up to 5 years
- Requirement for 75% protected time for research or career development.
- Research and training expenses
  - Amount varies by institute (usually \$25,000 per year)
  - Tuition
  - Travel
  - Consultant fees (statistical consultation)
  - Research assistants

## Time and Effort Accounting

- Effort required is 75% of full-time professional effort
- Full-time effort has been variably defined at NIH
  - Total number of hours worked
  - 40 hours per week
- Receipt of federal funds for 75% effort and expenditure of less than that effort has been considered fraud punishable by return of funds and penalties (e.g. Northwestern University)
- University now monitors time and effort reporting

# Sources of Research Grant and Training Support

University and Medical School

Foundations

Voluntary Health Agencies

Industry

Government

State

Federal

Outside Public Health Service

Public Health Service

Outside NIH

NIH

## Advantages of Diversification of Funding Sources

- Different sources may allow different uses for funds
- Idiosyncrasies of funding source's interest in your field
- Some sources of funds are tied to economy, political trends, etc
- Large, single source funding puts team at risk of intermittent layoffs, shutdowns

# University and Medical School Funds

New investigator awards

Pilot studies

Endowments

## Research Grant and Training Funds from Foundations

- Sources of large amounts of support for health (501(c)(3))
- Foundation Directory is useful to identify opportunities
- Foundations may be limited
  - Geography
  - Topic of interest
  - Type of support
- Review group and board of trustees make the decisions; often idiosyncratic
- Often a good source for pilot funds; foundations like to see their money leveraged up to federal funding
- Letter of intent often important in getting to submit full proposal
- Contact person usually identified and worth discussing your proposal with

# Voluntary Health Agencies

- Frequently oriented toward one disease (e.g American Cancer Society, American Heart Association)
- Menu of career development opportunities from medical student support, post doctoral fellowships, new investigator awards, midcareer awards, and established investigator awards.
- Review groups often similar to those of NIH
- Amount of award is often limited
- May have several layers of awards (e.g., local or state affiliate, national center), providing opportunities for progression to increasingly competitive awards.

# Industry

- Biomedical research support exceeds that of NIH
- Focused on company priorities, but these may overlap with those of the investigator
- Need institutional safeguards
  - Who owns the data?
  - If company owns the data, will the investigator be able to publish?
  - Issues of product liability
- Best form is an unrestricted research or educational grant

## Health-related Grants from State Government

- Often service-oriented rather than research-oriented
- May provide opportunities to pilot interventions or to evaluate programs
- Announced by RFP and bidder's conference
- Often highly political

## Health-related Grants from Federal Sources

- Numerous sources outside of Public Health Service (e.g., Department of Defense, Department of Justice, Department of Agriculture).
- Numerous PHS sources outside of NIH (e.g., CDC, AHRQ, HCFA, HRSA).
- National Institutes of Health
  - 21 institutes and centers
  - Institutes differ in their grant programs
- Most desirable from financial point of view, as they pay negotiated rate of indirect costs.

## Type of Research Funding by Requirement

Grant	Patron (assistance, encouragement)
Cooperative Agreement	Partner (assistance but substantial program involvement)
Contract	Purchaser (procurement)

# Finding Sources of Support

NIH Guide

RFA/RFP

Program Announcements

Grant and contract publication

University-based computer services

# Websites of Interest

National Institutes of Health ([www.nih.gov](http://www.nih.gov))

Office of Extramural Research ([www.nih.gov/grants/oer.htm](http://www.nih.gov/grants/oer.htm))

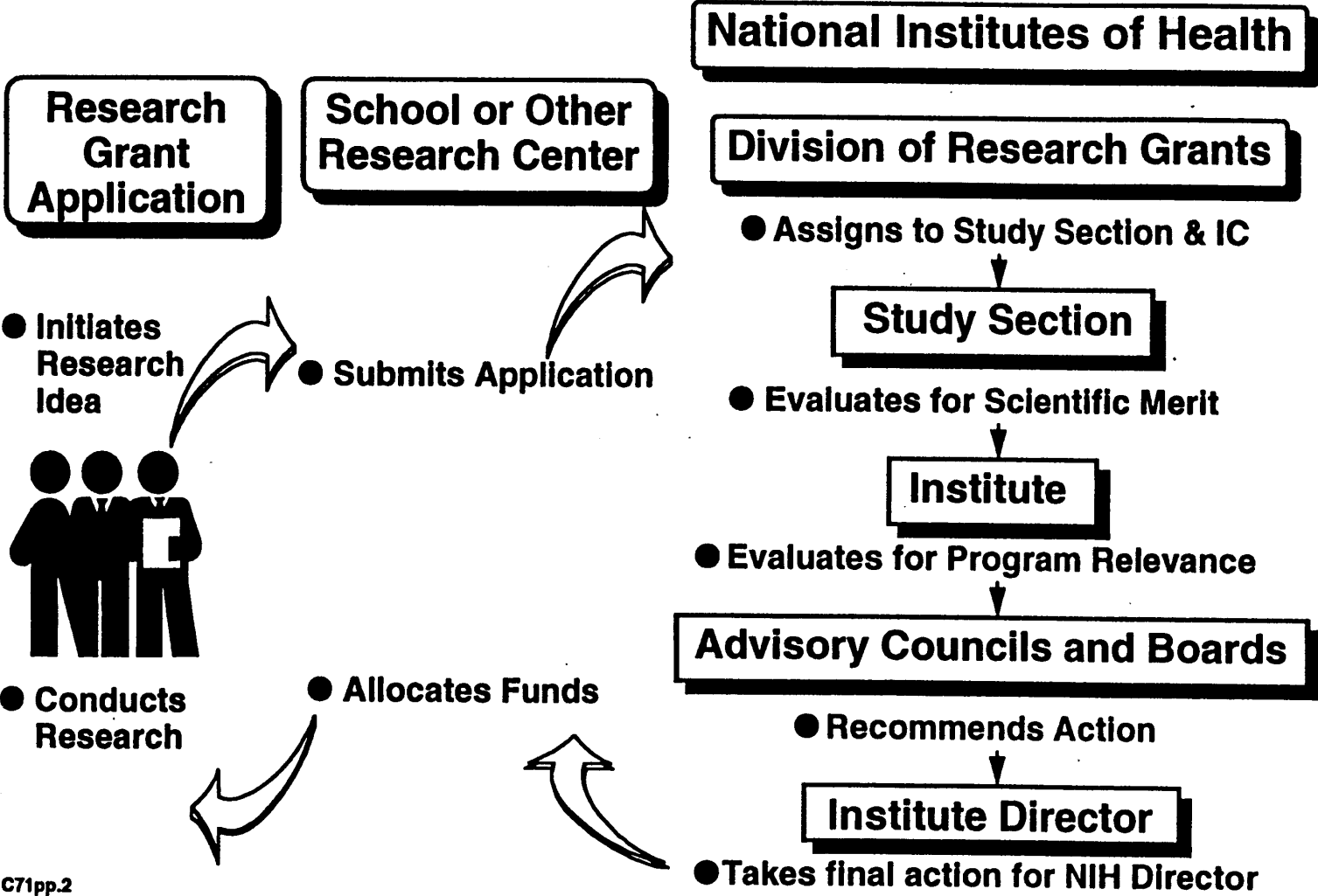
Grants Policy ([www.nih.gov/grants/policy/policy.htm](http://www.nih.gov/grants/policy/policy.htm))

Overview of Peer Review Process ([www.drg.nih.gov/review/peerrev.htm](http://www.drg.nih.gov/review/peerrev.htm))

Study Section Roster ([www.drg.nih.gov/committees/rosterindex.asp](http://www.drg.nih.gov/committees/rosterindex.asp))

American Heart Association ([www.americanheart.org/research](http://www.americanheart.org/research))

# Review Process for a Research Grant



# Dual Review System for Grant Applications

## First Level of Review

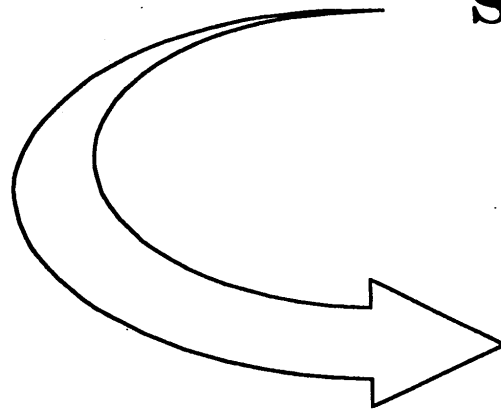
### Scientific Review Group (SRG)

- » Provides Initial Scientific Review of Grant Applications
- » Rates Applications and Makes Recommendations for Appropriate Level of Support and Duration of Award

## Second Level of Review

### Council

- » Assesses Quality of SRG Review of Grant Applications
- » Makes Recommendation to Institute Staff on Funding
- » Evaluates Program Priorities and Relevance
- » Advises on Policy



# Criteria for Selection of Peer Reviewers

- Demonstrated Scientific Expertise
- Doctoral Degree or Equivalent
- Mature Judgment
- Balanced Perspective and Objectivity
- Ability to Work Effectively in a Group Context
- Interest in Serving
- Adequate Representation of Women and Minority Scientists

# Confidentiality

- Review materials and proceedings of review meetings represent privileged information to be used only by consultants and NIH staff.
- At the conclusion of each meeting, consultants will be asked to leave proposals and other materials sent to them.
- Consultants should not advise applicants of recommendations. Questions should be referred to NIH staff.

# Research Grants

## Review Criteria

- Significance and originality from a scientific and technical standpoint
- Adequacy of the methodology to carry out the research
- Qualifications and experience of the principal investigator and staff
- Reasonable availability of resources
- Reasonableness of the proposed budget and duration
- Other factors: Human Subjects, Animal Welfare, Biohazards, etc

# Scientific Review Group or Study Section Actions

- Unscored
- Scored, Scientific Merit Rating (priority scores: 1.0-4.9)
- Deferral

# What Determines Which Awards Are Made?

- Scientific merit
- Program Considerations
- Availability of funds

# When Preparing an Application

- Read instructions
- Never assume that reviewers “will know what you mean”
- Refer to literature thoroughly and thoughtfully
- Explicitly state the rationale of proposed investigation
- Include well-designed tables and figures
- Present an organized, lucid write-up

# Anatomy of a Grant Application: Administrative Sections

- Face Page
- Abstract
- Table of Contents
- Budget for Initial Budget Period
- Budget for Entire Project Period
- Biographical Sketch
- Other Support
- Checklist

# Anatomy of a Grant Application

- Introduction (Revised or Supplemental Applications)
- Research Plan
  - Specific Aims
  - Background and Significance
  - Preliminary Studies/Progress Report
  - Research Design and Methods
  - Human Subjects Research
  - Vertebrate Animals
  - Literature cited
  - Consortium/Contractual Assignments
  - Consultants

# Specific Aims

- List the broad, long term objectives and what the proposed research is intended to accomplish
- Often list 4-6 specific aims which are used to organize the background and significance preliminary studies, and design/methods sections
- State hypotheses to be tested
- One page is recommended

# Background and Significance

- Why should this proposal be funded?
- Critically evaluate existing knowledge
- Specifically identify gaps that the project is intended to fill
- Relate the specific aims to long term relevance
- Answer the “So what?” question
- Usually 2-3 pages in length

# Preliminary Studies/Progress Report

- Provide information that will help to establish the experience and competence of the investigator to pursue the proposed project.
- Competing continuation grants should summarize the previous application's specific aims and the progress made toward them
- May list publications relevant to or supported by prior grant and submit up to 10 manuscripts in Appendix
- Usually 6-8 pages

# Reasons To Do a Pilot Study

- Demonstrate ability to recruit/access/retain study population
- Establish ability to perform assay (reproducibility, validity, precision, accuracy, etc)
- Estimate prevalence/incidence of endpoints
- Quantify variability and magnitude of change in endpoint for purpose of sample size calculation

# Research Design and Methods

Overall Study Design

Patient Population

Data Collection

Endpoint Definition

Data Management

Data analysis

    Sample Size Calculation

Study Strengths and Limitations

Timeline

# Components of a Career Development Award

- Candidate
- Mentor(s)
- Institution
- Research Project

# Candidate for an RCDA

## (part of 25 page limit)

- Background and Training: Potential for research career
- Scientific Bibliography: Commitment to research career
- Career Development Plan / Training Activities
  - Formal coursework/degree program
  - Seminars/journal clubs
  - Summer institutes/outside courses
  - Annual scientific meetings
  - Interactions with mentor(s)
  - Publications, grant applications
  - Timeline for career development
- Training in Responsible Conduct or Research

## **Mentors(s) for an RCDA** **(not part of 25 page limit)**

- Primary mentor's experience
  - Background and training
  - Experience and funding in area of mentee interest
  - Track record and current involvement in research training
- Mentorship committee (3-4 co-mentors encourage multidisciplinary research)
  - Describe role of each co-mentor
  - May have co-mentors from outside institutions, as needed
  - Describe function of the mentorship committee
- Mentoring plan should be detailed

# Institutional Sponsorship of an RCDA

(not part of 25 page limit)

- Description of resources relevant to candidate's career
  - Education and training programs (e.g. K30)
  - Research facilities
- Institutional commitment signed by official
  - Support of candidate for faculty career development (e.g. tenure track)
  - Promise to protect % effort as required by the RCDA
  - Usually description of remainder of time not supported by RCDA

## Research Plan (part of 25 page limit)

- Similar to an R01, except shorter due to candidate's statement
- Preliminary results need not be lengthy, may include mentor's laboratory results if relevant
- Describe expected results and transition to R01 type funding

## Practical Tips for RCDA's

- K08/K23 have relatively good funding rates
- Submit K and then R01, not vice versa
- Understand NIH Institute's guidelines about submitting R01's during K Award. Transition of K to R is a measure of K award's success
- Aim for primary score of 180-240 (non-fundable) and prompt revision
- Talk with current K Awardees, review their proposals

## Questions Often Asked by Reviewers

- How meticulous are you? How much care do you give to detail?
- Do you show originality of thought?
- Do you plan ahead – and do so with ingenuity?
- Do you think logically and clearly?
- Do you have good analytical skills?
- Do you recognize limitations and potential pitfalls?
- Do you think about alternative procedures in case your proposed project does not go according to expectation?

# Common Problems in Applications

- Lack of new or original ideas
- Diffuse, superficial, or unfocused research plan
- Lack of knowledge of published relevant work
- Lack of experience in the essential methodology
- Uncertainty concerning the future directions
- Questionable reasoning in experimental approach
- Absence of an acceptable scientific rationale
- Unrealistically large amount of work
- Lack of sufficient experimental detail
- Uncritical approach

# Writing an Appealing Application

- Adherence to pitch, font, and margin rules
- Correct spelling or grammatical errors
- Organize by headings
- Strategic spacing, indentation
- Break-up text with figures, tables

# Summary Statement of Reviewer's Comments on Grant Application

- Primary, Second, Tertiary reviewers' comments unedited by scientific review administrator
- Summarize strengths and weaknesses
- Provides a recommendation of level of merit
- Uses
  - Primary document for next level of review
  - If funded, guide to NIH staff in the management of the program
  - Opportunity to improve the study
  - Assists in preparation of a revised application

# Revised Applications

- Improve the revised application
- Respond to all questions and weaknesses raised in the Summary Statement
- Indicate the changes made
  - Highlight by brackets, type, font
  - Elaborate on changes in Introduction (up to 3 pages)
- Add additional material to Progress Report
- Note later application deadline

# Final Thoughts

Don't leave until last minute.

Ask advice from mentors, colleagues.

Be patient and persistent.

Learn from critiques and feedback.