The Art of Grant Writing

Jennifer Cacciola, MPH
Grant Writer and Grant Development Officer
Overview

• Basic Proposal Elements:
  – Hypothesis
  – Abstract
  – Specific Aims

• Proposal Development Timelines
• Understanding the Review Process
• Helpful Hints and Suggestions
• NIH Funding Opportunities
Basic Proposal Elements: Writing Your Hypothesis

• Research Question
  ↪ Hypothesis
  ↪ Objectives/Specific Aims
Basic Proposal Elements: Writing Your Hypothesis

• Your **hypothesis** is not the **scientific** question in your project. The **hypothesis** is an educated, testable prediction about what will happen. Make it clear. A **good hypothesis** is written in clear and simple language.

• Repeat it often!
  – In the Abstract, Background, Specific Aims
  – State exactly the same way throughout
Basic Proposal Elements: Writing Your Abstract

• This is the most important section of your proposal!
  – Typically the only section every reviewer will read
  – Should capture the essence of your proposal
  – Must be clear, concise, and logical
Basic Proposal Elements: Specific Aims

• Specific aims should be:
  – Compelling
  – Clearly hypothesis-driven
  – Not names of experiments

• Specific aims should be SMART
  – Specific
  – Measureable
  – Attainable
  – Realistic
  – Time-bound
Proposal Development Timelines

- **12-18 months before deadline:**
  - Discuss ideas with others
  - Complete current experiments and publish results to show:
    - Productivity
    - Ability to take a project from an idea to published completion

- **6-12 months before deadline:**
  - Generate preliminary data
Proposal Development Timelines

• 3-6 months before deadline:
  – Create initial draft of proposal
• 2-3 months before deadline:
  – Obtain comments from colleagues, revise accordingly
• 1-2 months before deadline:
  – Prepare budget and “non-science” parts
• 1 month before deadline:
  – Have draft of “final version”
  – Obtain additional comments from colleagues on the “whole package”
Proposal Development Timelines

• 1-2 weeks before deadline:
  – Final version proofreading (by someone who has not seen it before) and then proofread again!

• 5-7 days before deadline:
  – Make necessary copies of all parts (figures, etc.)
  – Obtain required signatures

• 2-3 days before deadline:
  – Submit proposal
So what?
Understand the Review Process

• Reviews take no less than 10 minutes per proposal and read more than
• Each reviewer could be assigned 10-25 proposals to review
• The harder you make a reviewer work hard, the probability of your proposal being funded decreases exponentially!
• Work to make reviewers champion your proposal; write your grant like you’re going to be the 25th proposal the reviewer will read
Understand the Review Process

• Conduct your own review based on NIH’s 5 areas of peer review criteria:
  1) Significance
  2) Investigator(s)
  3) Innovation
  4) Approach
  5) Environment
Common Criticisms from Reviewers

• Poorly written
• Not well justified
  – scientific problem
  – experimental model
  – relevance to program priorities or purpose
• Lacks convincing preliminary data
• No hypothesis or poorly presented
  – Not hypothesis-driven, studies are descriptive
Common Criticisms from Reviewers

• Objectives don’t address hypothesis
• Objectives lack focus, too diffuse
• Approaches and methods lack detail needed to evaluate potential for success
• Investigator lacks expertise with given approach
• Expected results not presented, interpreted
• Pitfalls not addressed, alternative solutions not presented
Common Criticisms from Reviewers

• Overly ambitious, too much or too difficult to accomplish in reasonable time-frame
• Timeline unrealistic for successful completion of proposed project
• Resubmitted proposal did not address concerns identified during previous review
Helpful Hints and Suggestions

• High probability of success:
  – Focused
  – Feasible
    • Solid preliminary data
    • Letters from experts expressing support and willingness to help
  – Each section of the proposal linked to each other:
    • Rationale for each study linked to an aspect of hypothesis
    • Potential outcomes of experiments linked to proving or disproving the hypothesis
Helpful Hints and Suggestions

• Avoid using terms indicating ‘description’:
  – “correlate”
  – “describe”
  – “assess”
  – “measure”

• Avoid passive voice, flowery terms, wishy-washy terms
Helpful Hints and Suggestions

• Significance:
  – Deliver your message fast – don’t make the reviewer work to figure out what you are trying to say
  – Proposed studies yield information that is unique
    – how is this new and innovative?
  – Relevant to the ‘big picture’
  – Key to convincing reviewers to support your proposal rather than that of your competition
Where is the Money?

- Federal Government: $617 Billion
- Individuals: $265 Billion
- Foundations: $58 Billion
- Corporations: $18 Billion

Total: $617 Billion
NIH Grants – Research Grants (R series)

NIH Research Project Grant Program (R01)

• Used to support a discrete, specified, circumscribed research project
• NIH's most commonly used grant program
• No specific dollar limit unless specified in FOA
• Advance permission required for $500K or more (direct costs) in any year
• Generally awarded for 3 -5 years
• Utilized by all ICs
• See parent FOA: PA-16-160
NIH Grants –
Research Grants (R series)

NIH Small Grant Program (R03):
• Provides limited funding for a short period of time to support a variety of types of projects, including: pilot or feasibility studies, collection of preliminary data, secondary analysis of existing data, small, self-contained research projects, development of new research technology, etc.
• Limited to two years of funding
• Direct costs generally up to $50,000 per year
• Not renewable
• Utilized by more than half of the NIH ICs
• See parent FOA: PA-16-162
NIH Grants – Research Grants (R series)

NIH Academic Research Enhancement Award (AREA) (R15)

• Support small research projects in the biomedical and behavioral sciences conducted by undergraduate and/or graduate students and faculty in institutions of higher education that have not been major recipients of NIH research grant funds

• Eligibility limited (see https://grants.nih.gov/grants/funding/area.htm)

• Direct cost limited to $300,000 over entire project period

• Project period limited to up to 3 years

• All NIH ICs utilize except FIC and NCATS

• See parent FOA: PA-16-200
NIH Grants –
Research Grants (R series)

NIH Exploratory/Developmental Research Grant Award (R21)

- Encourages new, exploratory and developmental research projects by providing support for the early stages of project development. Sometimes used for pilot and feasibility studies.
- Limited to up to two years of funding
- Combined budget for direct costs for the two year project period usually may not exceed $275,000.
- No preliminary data is generally required
- Most ICs utilize
- See parent FOA: [PA-16-161](https://example.com/PA-16-161)
NIH Grants –
Career Development Awards (K series)

Mentored Patient-Oriented Research Career Development Award (K23)

• support the career development of individuals with a clinical doctoral degree, who have the potential to develop into productive, clinical investigators, and who have made a commitment to focus their research endeavors on patient-oriented research.

• An award is for a period of 3 to 5 years and provides support for salary and research-development support costs.

• No preliminary data is generally required

• Eligibility: U.S. citizen or permanent resident, with clinical doctoral degree and completed clinical training; U.S. domestic institutions

• Career Level: Postdoctorate/Residency, Early Career

• See parent FOA: PA-16-161
## NIH Grants – Submission Deadlines

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