The Ins and Outs, and Highs and Lows, of Applying for a Research Grant

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Applying for a Research Grant

Biomedical Research

The Research Process

8 Steps in Preparing to Write a Grant Proposal

18 Steps in Writing a Grant Proposal

Common NIH Grant Mechanisms

My Grant Support Trajectory, as an Example

General Pointers
Biomedical Research
Biomedical Research

*Rich and diverse forms of research:*

- Basic sciences
- Family studies, genetics
- Clinical research, phenomenology
- Interventional (pharmacologic, psychosocial, surgical)
- Epidemiology, disease surveillance
- Health services research, dissemination, policy
- Research on medical education

I can only comment on the *general* process of grant writing, *based on my experience.*
The Research Process
8 Steps in Preparing to Write a Grant Proposal
1 Identify a Problem of Interest to You

- A problem or issue that you encounter clinically that *fascinates* you
- Something that you’re deeply interested in and *passionate* about

- Not just whatever your attending or mentor or chairman is studying
2 Study the Existing Literature on that Problem

- Has it already been solved, or adequately addressed?
- Does the literature suggest directions for research?
- What needs to be done next in this area?
3 Do Some Writing / Publishing on the Topic

- *Work closely with one or more mentors*
- Identify any local experts/researchers
- Write a case report, or a case series
- Write a review article or two
- Refine areas requiring research
4 Learn about Grant Writing

- If you have the opportunity, work with a PI to help write and compile a grant proposal
- Read a couple of successful grant proposals
- Take some seminars or conference presentations on “grantsmanship”
5 Establish Formalized Relationships with ≥ Mentors

- Inside v. outside your institution
- Content expert v. process expert v. both
- Prior success in productivity and grants
- Assess fit (commitment, time, personality, etc)
- Mentor v. consultant
- Formalize the relationship with your 1° mentor
Having a Mentor May Be the Most Important Step
6 Identify Potential Funding Agencies

- Are there any current Requests for Applications (RFAs) specific to this topic?
- If not, what funding agencies might accept investigator-initiated grant proposals on this topic?
- Work closely with your mentor
NIH Funding v. Other Sources

NIH

- Perhaps most prestigious
- Diverse institutes and centers, and mechanisms
- Generous level of funding support
- Significant indirect (facilities & administration) costs awarded to the institution to support research infrastructure
  - Highly competitive

NIH support is often the backbone of a successful research agenda, though other sources can be complementary.
NIH Funding v. Other Sources

- NIH
- Industry (e.g., pharma)
- General foundations
- Disease-specific foundations
- Professional organizations
- Institutional support (seed grants, CTSAs)
- Philanthropy/endowments
7 Identify the Most Appropriate Grant Mechanism

- If the funding agency has more than one grant mechanism, which is most suitable for the scope of your study and the stage of your career?

  *Work closely with your mentor*
8 Write a Grant Proposal

- Start small
- It’s easier to get a grant if you’ve had a grant
- Maintain enthusiasm, optimism, openness
- *Work closely with your mentor*
1. Identify a Problem of Interest to You
2. Study the Existing Literature on that Problem
3. Do Some Writing/Publishing on the Topic
4. Learn about Grant Writing
5. Establish Formalized Relationships with One or More Mentors
6. Identify Potential Funding Agencies
7. Identify the Most Appropriate Grant Mechanism
8. Write a Grant Proposal
18 Steps in Writing a Grant Proposal (order is not fixed)
1 Very Carefully Review the RFA and Funding Agency

- Optimize the fit between their goals/mission and your aims/hypotheses
- Use their wording
- Follow their guidelines precisely
2 Develop/Write the Specific Aims Page

- NIH terminology, but applicable elsewhere
- 1 very tight page
  - Introduce the problem/issue
  - Concisely explain exactly what you plan to do (e.g., design, sample, how data will be collected)
  - List your ~2-4 Aims
  - List your hypotheses, articulating precise variables, how they will be measured, how they will be handled in terms of data analysis
3 Vet the Specific Aims Page

- Work closely with your mentor
- Send to ~3 content experts/consultants
- Work on getting the scope right (i.e., proposing something that’s not too big and not too small)
4 When Possible, Send Your Specific Aims Page Draft to the Program Officer (NIH) or Funding Agency Representative

- Ask for their advice
- Incorporate their advice
- Ask for re-review
5 Use Your Specific Aims Page to Guide Your Writing of All Other Components of the Grant Proposal

- The Specific Aims page will evolve somewhat over time
- Create a cohesive, compelling application
- When possible, take a look at previously funded grant applications
6 Frequently Recall Who the Reviewers Will Be

- Assume that one will be a content expert and established researcher
- Assume that one will be an established researcher but not familiar with the specific subfield
- Assume that one will be a statistician
7. Emphasize Impact, Significance, and Innovation

- What public health problem does your proposal address?
- How will accomplishing your Aims advance research *and clinical care*?
- What gaps does your study fill?
- How does it push the field forward?
- Where will it lead you, and the field?
8 Emphasize Preliminary Data

- Data that led up to your Aims and Hypotheses
- Early evidence that hypotheses have merit
- Data that support feasibility that you can carry out what you are proposing to do (e.g., techniques, patient enrollment)
- Proposed work is a logical extension of previous studies
9 Emphasize Investigators and Institutional Resources

- Biosketches
- Facilities and Other Resources page
- Letters of support from facility managers and consultants
- Bring in highly qualified co-investigators and consultants
10 Emphasize Reliability and Validity of Your Measures

- Reliability
  (repeatability, reproducibility, consistency)
- Validity
  (accuracy, precision)
11 Delineate a Clear Timeline

- Exactly when will each step of the research be conducted?
- Ensure feasibility
- Don’t be “overly ambitious”
- Address how you will handle various barriers that may arise during the study
12 Develop a Reasonable Budget

- Work closely with your mentor the first time
- Provide and in-depth budget justification
- Remember yearly raises for personnel
- Work closely with your grants liaison

Future budgets will be easier to develop as you will have a template
13 Have a Solid Data Analysis Plan

- Ensure that hypotheses, measures, variables, and analyses are tightly linked
- You’ll need a power/sample size analysis
- Work closely with a statistician
14 Vet the Overall Proposal

- Send to 1-3 content experts/consultants (ask them to pretend to be reviewers)
- Politely ask if the Program Officer or funding agency representative would like to review the current draft
- Be open to input
- You may not be able to incorporate all input
- *Work closely with your mentor*
15 Perfect the Proposal

- Clear
- Concise
- Precise
- Formatted to make it clear and convincing

- Think like a reviewer (content expert, non-content expert, statistician)
16 Carefully Write the Abstract

- Likely to be read by the entire committee
- Needs to be understandable as free-standing, clear, convincing
- Cover significance, innovation, investigators, environment, and approach
17 Route the Proposal

- *Work closely with your grants liaison*
- After ample time to revise, edit, and perfect
- Follow their guidelines; give the University at least 2 weeks for routing
- This is a busy period of budget adjustments and other fixes to the application
- Be a good partner – you will come to rely heavily on everyone along the route
18 Submit the Proposal

- After final perfecting
- Aim for several days before the deadline to have time to fix any errors
- Celebrate your accomplishment
1. Very Carefully Review the RFA and Funding Agency
2. Develop/Write the *Specific Aims* Page
3. Vet the Specific Aims Page
4. When Possible, Send Your Specific Aims Page Draft to the Program Officer / Funding Agency Representative
5. Use Your Specific Aims Page to Guide Your Writing of All Other Components of the Grant Proposal
6. Frequently Recall Who the Reviewers Will Be
7. Emphasize Impact, Significance, and Innovation
8. Emphasize Preliminary Data
9. Emphasize Investigators and Institutional Resources
10. Emphasize Reliability/Validity of Your Measures
11. Delineate a Clear Timeline
12. Develop a Reasonable Budget
13. Have a Solid Data Analysis Plan
14. Vet the Overall Proposal
15. Perfect the Proposal
16. Carefully Write the Abstract
17. Route the Proposal
18. Submit the Proposal and Celebrate Your Accomplishment
Common NIH Grant Mechanisms
K23
- Patient-oriented mentored career development award
- 75% effort support + $50K per year for 5 years

K12 / KL2
- *Institutional* mentored career development award (e.g., CTSI-CN)
- 75% effort support + $25K per year for 3 years before K23 application

R03
- Pilot/feasibility studies and preliminary data; $50K per year for 2 years

R21
- Exploratory/developmental projects; $275K total for 2 years

R34
- Clinical trial/intervention planning grant; up to $475K total for 3 years

R01
- The major independent mechanism; usually $500K per year for 3-5 years
Review Criteria

Overall Impact
Significance
Innovation
Investigators
Environment
Approach

Human Subjects Protections, Budget, Inclusion of Women, Inclusion of Minorities, Inclusion of Children, Biohazards
Scientific Review Group

- Assigned reviewers (3) summarize their critiques and give scores in the 6 areas
- Committee typically discusses the top 50% of applications based on those scores
- Others are “not discussed and not scored”
- Those discussed are scored for overall impact by all committee members
- Funding usually available for proposals scored in the top 10%
But Don’t Forget to Look into Industry, Foundation, Non-Profit, Association, and Institutional Funding Sources
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General Pointers
Near-Perfection

- Every study design is flawed to some extent
- But your grant proposal needs to be perfect in every other way
- Seek assistance when necessary
  - Edit, edit, edit
  - Follow all instructions
  - Adhere to all page limit requirements
  - Structure it exactly how they want it structured
Balance Optimism and Realism

- Roughly equal success rates for MDs & PhDs
- Up to submission, work only from a stance of utter optimism (you have complete control)
- After submission, wait in a stance of realism (the universe has complete control)
The Practice is Useful

- Every grant proposal submitted is really, really important *practice*
- Practice makes perfect, and brings ultimate success
They Get Easier

- Once you start accumulating “templates” from your prior grant documents, future grant proposals are easier to write
- It’s easier to get a grant if you’ve had a grant
Perseverance

- Expect rejections (be thankful for the practice)
- Dust off
- Immediately set an exact timeline for the next one
- Proposals are rarely funded after the initial review (success increases for revisions)
- Revision allows for improvement
If You Get a Request for Revision (or an NIH Score)...

- Jump on it immediately and whole-heartedly
- Talk to the Program Officer
- Revise it exactly and completely as they’ve requested/critiqued
- Convey enthusiasm, optimism, readiness
Plan Ahead

- Timeline from starting grant writing to funding is usually ~2 years, or even 3
July 2010 – September 2010 (~3 months)

October 2010 – January 2011 (~4 months)

February 16th 2011 (~5 months)

July 2011 (~4 months)

November 16th 2011 (~5 months)

April 2012 (~4 months)

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score given

start date for funded research
July 2010 – September 2010 (~3 months)

October 2010 – January 2011 (~4 months)

February 16th 2011 (~5 months)

July 2011 (~4 months)

November 16th 2011 (~5 months)

April 2012 (~4 months)

July 2012

brainstorming, planning, collaborating, selecting agency/mecchanism

grant writing

initial submission date

under review

score given

revision submission date

under review

score given

start date for funded research
Work Closely with Your Partners

Your Program Officer

Your Mentor

Grant Applicant

Your Grants Liaison

Your Statistician
✓ Near-Perfection
✓ Balance Optimism and Realism
✓ They Get Easier
✓ Perseverance
✓ If You Get a Request for Revision (or NIH Score)...
✓ Plan Ahead
✓ Work Closely with Your Partners
Just a Few References

The Ins and Outs, and Highs and Lows, of Applying for a Research Grant

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