

Grants 101 Part III Writing a Grant



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Grants 101

- ▶ How NIH works—Tom Hawn
- ▶ Research Administration—Monica Fawthrop
- ▶ Writing a Grant—Sheila Lukehart
- ▶ Behind the Scenes at Study Section—Bill Parks

NIH and Career Development Awards

- ▶ Types of Grants
- ▶ Writing your application
- ▶ Required components
- ▶ Tips for getting good reviews

NIH Awards

- ▶ R-series Research Grants R03, R21, R01
- ▶ Individual Training Awards
 - K-series K08, K23, K01, K99/R00, K22, K02, K24
 - F-series F32

NIH Career Development Awards

- ▶ K Kiosk for information
<http://grants.nih.gov/training/careerdevelopmentawards.htm>
- ▶ R information
http://grants.nih.gov/grants/funding/funding_program.htm#RSeries
- ▶ General Grant info
http://grants.nih.gov/grants/about_grants.htm

NIH Structure—Contacts

24 Institutes



Finding information and contacts at NIH

- Go to K Kiosk and click on the desired award



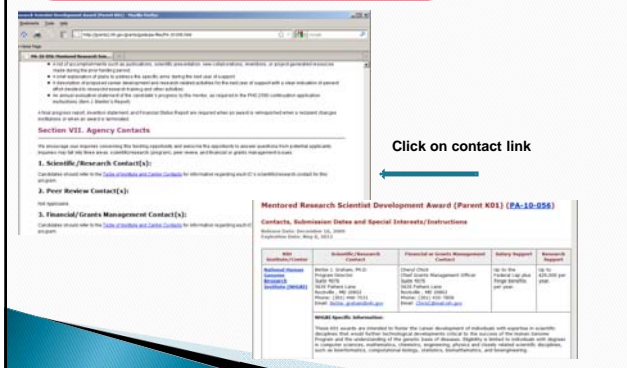
Program Announcement

READ THIS CAREFULLY!!

- Purpose
- Eligibility
- Deadlines
- Page limits
- Links to forms
- Required sections
- Review criteria
- Animal, human subjects info
- Contacts



Finding contacts at NIH



How to Get Started Writing a Grant

- Administrative Issues: Their Rules and Yours
- Mechanics: Putting Your Best Foot Forward
- Timeline for preparing the application
- Business pages
- Science: Last but Certainly Not Least
- Actually writing the application
- Special sections for K Awards

Administrative Issues: Their Rules and Yours

- Figure out what kind of grant you will be writing
- Read the Program Announcement and Instructions—and read them again!
- Talk with a Program Officer

Administrative Issues: Their Rules and Yours

- Talk with your departmental administrator
- Find out how many offices your grant needs to pass through at your institution—and their deadlines
- Learn about Electronic Grant submission
- Sign up for an account on Commons

NIH Commons

The screenshot shows the NIH Commons website with a header for the National Research Administration. Below the header, there is a 'SYSTEM STATUS' section with several bullet points: 'All systems currently available', 'Scheduled System Maintenance', 'Support', and 'Electronic Submissions'. There are also sections for 'Commons 2.0' and 'About the Commons' with various links and information.

Timeline for Writing a Grant Application

- >4 months ahead Read NIH website about grants
Talk with NIH official
Decide on grant mechanism
Meet with grants administrator at your institution
- Week -12 Think, read, cogitate about research plan
- Week -10 Draft Specific Aims, give to mentor, meet to discuss, revise
- Week -6 Give full draft of research plan to mentor; request letters

Timeline for Writing a Grant Application

- Week -6 Work on business pages, including HSD, IACUC, EH&S
- Week -5 Revise draft
- Week -3 "Final" draft to mentor
Begin to route business pages
- Week -2 Finished text sent to Institutional Grants Office
- Week -1 Submit to agency
- Due Date It's there on time!!!

Business Pages

- ▶ Cover letter
- ▶ Face page
- ▶ Budget and Justification
- ▶ Biosketch
- ▶ Resources & Environment

Biosketch

The screenshot shows the NIH Biosketch form, which is a structured document for providing biographical information. It includes sections for 'PERSONAL STATEMENT', 'EDUCATION', 'POSITIONS AND HONORS', 'RESEARCH SUPPORT', and 'ADDITIONAL INFORMATION'. There are also checkboxes for 'Check if you are currently employed by a government agency' and 'Check if you are currently employed by a not-for-profit organization'.


Tips and Pet Peeves

- Keep the Personal Statement succinct
 - Make clear when you started your time in the lab
 - Do not follow the NIH example
- DO NOT include abstracts as Publications
- Publications
 - Up-to-date (no "In press... for 2005")
 - Complete citations, all authors
 - Name changed? Let us know.
 - Must match what we see online
- Some leeway is OK for new investigators
 - OK to include manuscripts submitted and in preparation
 - OK to add another heading for abstracts (e.g., Presentations)
- Important to show what you have done

Mechanics of Grant Writing: Putting Your Best Foot Forward

- ▶ Use simple, clear language
- ▶ Use correct font and margins
- ▶ Observe page length restrictions
- ▶ Use proper English, grammar, punctuation
- ▶ Avoid jargon
- ▶ No typographical errors!
- ▶ Visually appealing

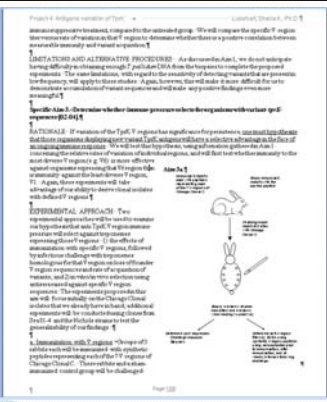
Boring—and causes tired eyes.....



When looking at a boring text, the brain is working hard to process the information. This is because the text is not organized in a way that is easy to read. The text is full of long sentences, complex words, and a lot of unnecessary information. This makes it difficult for the reader to understand the main point of the text. The text is also full of errors, such as typos and missing punctuation, which further adds to the frustration. The overall result is a text that is boring and causes tired eyes.

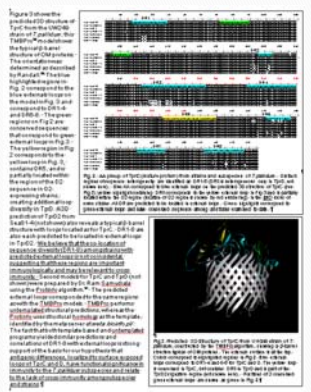
Visual Appeal

- Open space
- Clear organization
- Use of **Bold**, **CAPITALS**, underlining to define sections
- Figures and flow charts to explain experimental design



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Writing a Research Grant Application

- You must have a simple testable hypothesis that is supported by preliminary data
 - Study Sections are conservative
 - No preliminary data = No award
 - Less prelim data needed for K's
- Demonstrate medical significance
- Critically evaluate the published literature—including your own papers!

Writing a Research Grant Application

- Write for a general scientific audience
- Do not assume that the reviewer knows your field or that he/she will read your publications
- Repetition is good
- Simple is important
- Spoon-feeding is optimal

Page Limits—K Awards

- Specific Aims—1 page
- Candidate Information
 - Background
 - Career Goals and Objectives
 - Career Development/ Training Activities*
- Research Plan
 - Significance
 - Innovation
 - Approach
 - Preliminary Results
 - Research Design & Methods
- Bibliography

12 pages!!!

* Training in Responsible Conduct of Research is NOT included in the page limits!!!

Components of R Applications

6 or 12 pages!!

- ▶ Specific Aims—1 page
- ▶ Research Plan
 - Significance
 - Innovation
 - Approach
 - Preliminary Studies
 - Research Design & Methods
 - Timeline, Biohazards
- ▶ Bibliography

Page Limits—R applications

	R01	R03	R21
Specific Aims	1	1	1
Research Plan	12	6	6

Additional Considerations

- ▶ Protection of Human Subjects
- ▶ Inclusion of Women & Minorities, Children (<21), Targeted/Planned enrollment
- ▶ Vertebrate Animals
- ▶ Select Agents
- ▶ Multiple PI Leadership Plan
- ▶ Consortium/Contractual Arrangements
- ▶ Letters of Support
- ▶ Resource Sharing Plan
- ▶ Training in Responsible Conduct of Research (K's)

Things to do ahead of time

- ▶ Preliminary data to support hypotheses
- ▶ Publish papers
- ▶ Develop a good mentoring team
- ▶ Courses and Compliance
 - Human subjects training
 - Animal training
 - EH&S training

The Science: Last But Certainly Not Least!

- ▶ Schedule uninterrupted time to sit and think—days of time
- ▶ Keep a notepad handy to jot down your thoughts and ideas
- ▶ Think about the topic that you are studying
- ▶ Read the latest papers in your field as well as some well-written review articles

The Science: It comes together....

- ▶ Think in the shower
- ▶ Think as you walk around a lake
- ▶ Think as you are on the elliptical trainer at the gym
- ▶ Begin to see connections and patterns among your ideas
- ▶ Follow your heart as well as your mind

The Science: It comes together....

- ▶ Explore the most intriguing lines of research further—read related literature from other fields
- ▶ Synthesize the information
- ▶ Put “your disease” in the context of others
- ▶ Forest and trees.....

Preparing to write the application

- ▶ Read the instructions!
 - Program Announcement
 - SF424 Instructions
- <http://grants.nih.gov/grants/funding/424/index.htm>
Note Section 7: Specific instructions for K applications
- ▶ Be aware of page limits, fonts, and size
- ▶ Look at tutorials online
- ▶ Read a successful application

Writing the application

- ▶ Start planning and writing very early (3–4 months before due date)
- ▶ Talk with the administrator who will assist with application
- ▶ Have your mentor and others read the full application early (6 weeks before due date)

Writing the application

- ▶ Don't underestimate the time that it will take to do the “business” pieces of the application
- ▶ Be aware of OSP's new timeline:
 - ▶ Final business 7 work days before due date (Must clear other offices first!!!!)
 - ▶ Final science 3 work days before due date
 - ▶ Absolute drop-dead deadline for “ready to submit” is 3 business days before due date

Writing a Grant Application—Timeline

- ▶ Write Specific Aims and discuss with mentor/colleague
- ▶ Revise Specific Aims until you are satisfied
- ▶ Once the Specific Aims are finished, give yourself at least 4 weeks to write first draft of application

Writing a Grant Application—Timeline

- ▶ Full draft of Research Plan to mentor **six weeks** before submission date
 - Read and follow the instructions (electronic SF 424)
 - Prepare budgets with budget person
 - Other business pages (cover letter, face page, abstracts, personnel pages, biosketches, letters of collaboration, budget justification, facilities & resources, equipment)
 - Human subjects, Animal subjects, EH&S

Specific Aims

- ▶ The most critical page in the application
- ▶ It is a one page summary of the application
 - Why is this problem significant?
 - What is the hypothesis(es), and what data support it?
 - What are the exciting new preliminary data that support your aims?
 - What are you going to do?
 - What will your results mean for the field?

Specific Aims—1 page!!

- ▶ List your aims simply
 - Be somewhat general
 - Avoid long (laundry) list of things you are going to do
 - 2–4 Specific Aims is sufficient
- ▶ Everything should not be dependent upon Aim 1
- ▶ Aims serve as the backbone of your Research Plan

Significance (Background)

- ▶ Assume you are not writing for an expert
- ▶ Emphasize general medical importance and then specific importance of your topic
- ▶ Identify gaps in knowledge; state how you will fill those gaps
- ▶ Tie the background to each Specific Aim
- ▶ Discuss relevant controversies in the field
- ▶ Avoid selective citation of the literature
- ▶ No limit on number of citations

Innovation

- ▶ What is new about your idea?
- ▶ Will it change the way people think about the topic?
- ▶ How will your results affect the future of research in your field?
- ▶ Will it affect research in other fields?
- ▶ Simply using a new method is not innovative

Approach: Preliminary Studies

- ▶ Show preliminary data relevant to each aim and clearly tie the data to the aim (highlight **your** data)
- ▶ Show data for critical methods
- ▶ Include control data
- ▶ About 5–8 readable figures or tables (fewer for K's)
- ▶ Convince reviewer that you can do what you propose
- ▶ Critically analyze the data and state how your proposal will clarify questions about it

Approach: Preliminary Studies

- ▶ Put figures on relevant pages
- ▶ Number figures; refer to figure number in the text in bold (**Fig1**)
- ▶ Figures should be self-explanatory—legends, labeled axes, etc.

Approach: Research Design and Methods

Organize by Specific Aim

- ▶ Rationale and Hypothesis
- ▶ Experimental Approach
- ▶ Expected Results & Interpretation
 - Statistical analysis
 - Relate expected results to the question
- ▶ Potential Pitfalls and Alternative Approaches

Other Important Sections

- ▶ Future Directions
- ▶ Timeline
- ▶ Biohazards

Approach: Research Design & Methods

- ▶ Justify choice of methods
- ▶ Details of methods are unimportant (boring)
 - But make sure the reviewers know *you* know the methods
- ▶ Get collaborators and consultants– strong letters
- ▶ Timeline
- ▶ Biohazards

Aim	Description	YR 1	YR 2	YR 3	YR 4	YR 5
1A	Final of manuscript in submission-revision cycle					
1B	Manuscript submitted in vivo					
2A	Manuscript landing to KC/Symposium-1 completion					
3B	Revised manuscript of Symposium-1 accepted					
2C	Symposium-1 association with imagery					
3A	Binding issue of KC/Symposium-1 interaction					
3B	Manuscript submitted with abstract KC/Symposium-1					
3C	Final KC/Symposium-1 interaction in vivo					

Other Considerations

- ▶ Be thorough in addressing **all questions**
 - Humans subjects
 - Vertebrate Animals
- ▶ Address or state “Not applicable” to all categories
 - Select agents, Resource Sharing, etc
- ▶ Bibliography
 - Correct format

Mentored Training Award Applications

Candidate Section

- ▶ Background
 - Make it about *you*, not just your science
 - Obstacles, inspiration, pathway
- ▶ Career goals and objectives
- ▶ Career Development Plan

Mentored Training Award Applications

▶ Career Development Plan

- Critically analyze your strengths and weaknesses—how will this training address the weaknesses?
- Details of interaction with mentor
- More than science—grant writing, oral presentations, courses, supervisory experience, manuscript reviews, teaching
- Plan for moving toward independence
- Mentor’s statement must concur with what you say
- ▶ Training in the Responsible Conduct of Research—1 page (give detail!)

Mentored Training Award Applications

- ▶ Statements of Support (6 pages total)
 - Mentors, Co-mentors
 - Consultants, Contributors
- ▶ Mentor’s statement should include
 - Evidence of training history
 - Evidence of active productive research
 - Details about mentoring relationship—frequency of meetings
 - Topic areas in which mentoring will occur
- ▶ Co-Mentors’ statements should be specific about the expertise that they bring to the mentoring team

Mentored Training Award Applications

- ▶ Environment & Institutional Commitment to the Candidate
 - Description of Institutional Environment—1 page
 - Institutional Commitment to Candidate's Research Career Development—1 page (Generally letter from Dept Chair)

Mentored Training Award Applications

- ▶ Budget for the Entire Period of Support
- ▶ Letters of Reference
 - 3-5 letters from well-established scientists familiar with the candidate
 - May not be directly involved with the application

Scored Review Criteria—K's

- Overall Impact
- Candidate
- Career Development Plan
- Research Plan
- Mentor(s), Consultants, Collaborators
- Environment & Institutional Commitment

Additional Review Criteria*

- Protection for Human Subjects
- Inclusion of Women, Minorities & Children
- Vertebrate Animals
- Biohazards
- Resubmission applications

* These criteria DO affect the score

Additional Review Considerations

- Training in Responsible Conduct of Research—1 page
- Select Agents
- Resource Sharing Plan
- Budget and Period of Support



If at first you don't succeed.....

- ▶ Don't take it personally!!!
- ▶ Read the reviewers comments very carefully
- ▶ Put them away for a week
- ▶ Read them again
- ▶ Discuss them with your mentor or an established colleague
- Revision—one revised application can be submitted
- Listen to what the reviewers said!!

If at first you don't succeed.....

- ▶ Make a careful plan for revision
 - change aims?
 - more preliminary data?
 - explain things better?
- ▶ Have a fresh set of eyes look at the application, the review, and your proposed response

Response to Critiques– When you submit a revised application

- ▶ Restate each criticism and explain how you revised the application in response—make it easy for reviewer to find your “answers”
- ▶ Misunderstandings are *your* fault—if the reviewer missed a key fact in a figure or table, maybe it wasn't clear enough

Response to Critiques– When you submit a revised application

- ▶ Be diplomatic and positive (most reviewer's comments are useful)
- ▶ Don't argue with reviewers
- ▶ Avoid tone that says “The reviewer didn't know anything about this area”
- ▶ Avoid overstating your data

Don't give up!!

- ▶ Initial failure is common
- ▶ Learn from a failed submission and succeed next time
 - Study criticisms in Summary Statement
 - Decide if problems are repairable
 - Attend diligently to each criticism
 - Keep a positive tone and attitude
- ▶ “Good” amended applications tend to do well

The Rewards!

- ▶ Discovery!
- ▶ Help to understand, control, prevent or cure a disease
- ▶ Opportunity to develop the next generation of outstanding scientists



<http://www.nesc.nhs.uk/images/bio/medical%20scientists.jpg>