Grantsmanship

February 23, 2021
SITC Winter School

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Disclosures

• Nektar Therapeutics – Advisory Board/Honorarium
Overview

• Understanding the basic components of grant

• Organizing your work

• Telling/selling your story

• Overcoming barriers and responding to reviews
Know your funder!

Federal

• NIH
• DOD
• NSF

Non-federal

• Private foundations
  • Societies (SITC, AACR, ACS, etc.)
  • Disease specific (American Lung Association, Leukemia & Lymphoma Society, Melanoma Research Foundation, etc.)
### NIH vs. DOD

**R21**
- Exploratory, high risk, high reward
- No preliminary data is required
- Typical direct costs $500,000

**Idea Award with Special Focus**
- Exploratory, high risk, high reward
- No preliminary data is required
- Typical direct costs $400,000

### Similarities
- Preliminary data is almost always in funded applications
- Scored on Significance, Innovation, Approach, Investigator and Environment
- All reviewers are scientists

### Differences
- Preliminary data is almost never in funded applications (cannot support ongoing work in your lab)
- Scored on Scientific Merit, Impact and Innovation
- Reviewers include scientists, consumers from advocacy communities and military personnel
Basic tips

• Reference the agency/society/foundation’s mission in your grant

• Read the RFA (can sometimes be dense but often highlight “Areas of emphasis” that are of interest to the funder)

• Is the juice worth the squeeze?
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Typical Components of an NIH grant

**Scored**
- Specific Aims
- Research Strategy
  - Significance
  - Innovation
  - Approach
- Biosketches, Letters
  - Investigators
- Facilities
- Equipment
  - Environment

**Unscored but judged**
- Project Summary (Abstract)
- Project Narrative (public health/agency relevance)
- Bibliography
- Resource Sharing Plan
- Authentication Plan
- Human Subjects Plan
- Biosafety Plan
- Vertebrate Animals
- Budget/Budget Justification
Write your Specific Aims

• 1 page summary outlining the background, long term objective, your prior work, hypothesis and Aims (what you need the $ for).

• The number of Aims depends on the amount and length of the award

• Most valuable document during preparation and submission
  • You may need to share it with any letter of support writers, people editing your Research Strategy or with collaborators
  • Only 3 reviewers will critique your grant, but the whole study section will read your Specific Aims prior to discussion
Specific Aims

• Introductory/problem paragraph
  • Provide background (immune cell or the cancer), address the knowledge gap in the field

• Solution paragraph
  • You have the answer (long term objective), you have been preparing to provide the answer (your prior work) and the question you want to ask (hypothesis)

• Research Aims
  • How are you going to answer the question (hypothesis)
  • Briefly describe the Approach/experiments to address the Aims
Aims Dos and Don’ts

• **DO**
  
  • Be specific
    
    • “Enumerate anti-apoptotic proteins within...”
  
  • Have related but separate Aims

• **DON’T**
  
  • Talk in general terms
    
    • “Characterize the tumor microenvironment...”
  
  • Propose to discover something in one Aim that will inform direction of another Aim
    
    • “Overlapping Aims” = Achilles Heel
Identify collaborators and draft your letters (letters of support, institutional commitment, etc)

• Collaborators can provide
  • valuable expertise and reagents that you don’t have in your lab
  • preliminary data for your grant
  • proofreading
  • a raise to your Investigator score

• Be respectful of people’s time, send draft letters of support well in advance of the deadline esp. from academic leaders & industry

• A letter from a Dept chair, Cancer Center Director, other leader can show how much an institution is committed to you/your project
Writing your Research Strategy

Significance

• Review background research, cite seminal studies and assess rigor of prior work

• Should be 1-1.5 pages, schematic figures of pathways or concepts are helpful

• Bring the non-expert up to speed but also show the expert you are keeping up with the literature
Writing your Research Strategy

Innovation

• State, or even list, how this grant will generate innovative concepts or technical advances

• Should be 1/2 page

• If you are having trouble listing the innovation, you need to think bigger about what you plan to do and/or how you plan to do it!
Writing your Research Strategy

Approach

• Preliminary data (some put in a separate section and others weave supporting data into each Aim) can be published or unpublished.

• You have to help build your case that your Aims are going to work, and that you have the assays/mice/reagents to accomplish what you propose

• Write clear legends that describe what is shown! Define abbreviations! Show statistics!
Writing your Research Strategy

Approach

• Subaims should include detailed experiments that answer a question. Include control groups.
  • Mechanistic subaims will always “sell” better than descriptive aims

• Describe all assays/readouts/measures that will be used to interpret intervention
  • Include a statistical plan and consideration of biological variables like sex
  • Describe expected results – do the experiments answer the question?

• Include pitfalls/alternative approaches section
  • Be honest, not everything is going to work! Show you already thought of that and have a backup plan.
  • Future Directions at end of Approach is a nice way to summarize the grant
Biosketch

• Personal statement
  • Make sure ALL submitted biosketches tailor it to the grant objectives
  • List up to 4 publications for support
    • Consider submitting near completed, preliminary work to a preprint archive - citeable

• Honors/awards +/- professional memberships/service

• Contribution to science (up to 5) – Talk big!
  • This is your bibliography. Make sure a hyperlink to all your publications is there

• Grant funding (make sure it is current, not grants that ended 2yrs ago)
  • Be aware of overlapping grants!
Facilities

• Often boilerplate templates are available from colleagues at your institution

• Make sure to include any core facilities that may be involved in your proposal (include letter of support if necessary)
  • Assume reviewers have never been to your institution. We don’t know how state-of-the-art it is!

• Don’t forget to list facilities outside of your institution if they are collaborating
Budget

• Personnel
  • Make sure you include sufficient % effort so reviewers believe you are serious about the project
  • PIs 5% for each $50,000, can be less if you are heavily funded
  • Include the people who will do the work

• Equipment
• Supplies
• Travel
• Tuition remission
• Other costs
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The Elevator Pitch

- Practice telling people in 15 seconds
  - What you study
  - Why you study it
  - How you are going to change the field

- Have 2 versions
  - Lay people (=lay abstracts, project summary/narrative)
  - Scientists (=technical abstracts, specific aims)

- Repetition throughout grant of “the pitch” is good
Law and Order

• Pretend your scientific area/hypothesis is on trial in court

• Present your “evidence” (preliminary figures/tables) to the “jury” (reviewers)

• You want to convince the jury you know what happened (Significance) and what will happen if the Aims are successful (Approach)
Clues to solving a crime

• Essentially all research is a “whodunit?”

• Imagine reviewer saying “so what?” paragraph after paragraph

• Propose 2 different ways of answering the same question if need be
  • Will analyze cytotoxicity by X and verify results by Y
  • If you think of a 3rd way, add it to the alternative experiments section
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Writer’s block

• Draw your way out
  • “A picture is worth a thousand words”

• Record a voice memo
  • Many times it is easier to say what you want to do than write it down
  • You can play it back and write it down in a more professional manner (or use software that dictates your speech into writing)

• Work on unscored sections
Technology failure

• Save, save, save your documents repeatedly, even if they auto-save
  • A surprise crash is a rite of passage in academia

• Take the time to learn a graphics program, or use a professional illustrator
  • Word is not suited for grant writing. The bigger the document, the more figures jump around spontaneously

• Make the institution request your grant a week before the deadline, so in case something happens you have a buffer to correct it
You get the reviews back...

• Highlight the key points from each reviewer

• Organize common themes esp if from multiple reviewers

• Do NOT dismiss a criticism. Even if they are wrong, it is likely because you did not make your case clearly or explain the concept well

• Be prepared to generate more preliminary data! Show progress toward the Aims you have not yet been paid to do.
Useful websites

• NCI - Preparing grant applications:
  https://deainfo.nci.nih.gov/extra/extdocs/apprep.htm

• NIH – Writing your application:

• NIAID – Sample applications:
  https://www.niaid.nih.gov/grants-contracts/sample-applications

• NIH peer review videos:
  https://public.csr.nih.gov/NewsAndPolicy/PeerReviewVideos