



Society for Immunotherapy of Cancer

Grantsmanship

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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

Similarities

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

Differences

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

Idea Award with Special Focus

- Exploratory, high risk, high reward
- No preliminary data is required
- Typical direct costs \$400,000

- 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
 - Pls 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:
<https://grants.nih.gov/grants/how-to-apply-application-guide/format-and-write/write-your-application.htm>
- NIAID – Sample applications:
<https://www.niaid.nih.gov/grants-contracts/sample-applications>
- NIH peer review videos:
<https://public.csr.nih.gov/NewsAndPolicy/PeerReviewVideos>