

Tips For Writing Research Proposals

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The human context of the grant process

- Recognize that reviewers have other things to do and might not have as much time or energy to devote to your proposal as is ideal.
- Don't make their job harder than it already is. Use reasonable font and margins. Don't provide more detail than needed. Do provide helpful pictures but not dense data.
- Tell them a consistent story with one overall theme, and draw clear connections between all the parts of the proposal. Refer to the experimental design in the introduction, so the reviewer can see explicitly how the proposal fits together.
- To get funded, you need to convince the reader that this is exciting science. Make sure you communicate that excitement! Don't assume your reader has the same interests you do.

Writing a good proposal

1. What is the study section looking for in a standard research proposal?
 - All the grants are good, but you want them to get excited and say "this was my favorite grant," or "this is the most promising grant."
 - You must convince them this is an exciting topic and that you will accomplish what you propose.
 - You must convey the 'big picture': the context, and importance of the research you propose.
 - Tailor your proposal to the funding agency and the specific program.
- 1a. What is the study section looking for in a post-doctoral proposal?
 - Post-doc proposals are judged on the candidate, sponsor and training environment, research proposal and training potential, but reviewers are told "these are not research applications, so please don't nit-pick flawed research plans - rather aim to evaluate the **overall training potential**."
 - The training potential is a function of the candidate and sponsor, but the "proposed experience must augment the candidate's conceptual and/or experimental skills."
2. The first rule of writing is "don't irritate the reviewer."
 - Don't squeeze the margins.
 - Don't squeeze the text.
 - Don't try to pack in as much information as you can.
 - Avoid excessive abbreviations and complicated data.
 - Do provide explanatory figures.
 - Do provide rationales of where you are going and summaries of what you have just covered.
 - Be clear and organized.
 - Do large proposal break sections into sub-sections with explanatory titles in bold, to help the reader see the organization.
3. Remember who you are writing for.
 - Everyone on the panel is knowledgeable about many things, but it is highly unlikely they will be knowledgeable about what you are working on.
 - They will probably understand many of the methods you are using and many of the pitfalls you may encounter, but they may not know what others are doing and why your project is novel and important.
 - The biological importance of the area and of the expected results must be clearly laid out.
4. Role of preliminary data
 - It is important to establish general credibility with the reviewers. You want to show that you have the ability to do the experiments proposed, even if they have been published many times elsewhere. For example, a biochemist who has never done any cloning cannot simply get away with just saying, "we'll clone it."
 - There are many ways to address the issue of technical ability to do an experiment.
 - If you have published, you can say "as we have done before."
 - Otherwise, preliminary data shows you can accomplish your goals.
 - Also, a lucid description of the method can show that you know what to worry about and how to go about your research.
 - Finally, a letter of support from a colleague - hopefully near by - offering help and expertise will show you have the resources you need to complete your project.
 - Be careful about going into too much detail about how to do something fairly trivial. This can be a red flag for the reviewer because it suggests that you don't really understand the method.

- The other place where some preliminary data is important is where you have an absolutely critical result (or method) proposed. Some data showing that you are highly likely to get this result (or perform this technique) is critical.
- REMEMBER that everyone reading these proposals is busy. They have a lot to read and they do not want to spend a long time deciphering a complex set of data. **Keep the results simple!** Make the critical point and no more. Do NOT show them a bunch of data that they do not need to see. It is tiring, and a tired reviewer is not an excited one.

5. Key elements of a good proposal.

- Your proposal should have a single, simple theme; all parts of the proposal should be consistent with that.
- Write with 2-4 specific aims in mind, each of which should have a biological goal and be internally consistent, but also should fall under the larger theme of the proposal.
- Do not assume that you have the reader's undivided attention and the grant will be read in one fell swoop. In the Intro and Background, say what is known, note the importance of your recent progress and connect this information to your Experimental Design.
- In the Progress section, you cannot assume the reader has just read the Intro, so remind them in a sentence why the results you already have are important. Also tell them that this will be pursued in Specific Aim #X.
- Finally, in the Experimental Design section, remind the reader briefly of the Background and Progress before launching into detail.
- Write with a coherent whole in mind so your reader can keep track of the information presented and have a clear idea of the importance of your research. Anytime the readers ask themselves "should I know this?" or "why are they doing this?" you have a problem.
- Most reviewers want a "hypothesis-driven" proposal, so state your hypothesis(es) clearly and explicitly.
- It is almost always appropriate to list expected results and how they would be interpreted, as well as recognizing likely pitfalls, and how they will be circumvented.

6. When should you write a proposal?

- When you have a good story to tell. There is little reason to write a proposal that will not be funded and a poor proposal might hurt your future credibility.

7. How much time to spend on writing a proposal?

- Proposal writing is quite simply the hardest thing we do as professional scientists. It therefore is challenging for everyone, especially if you haven't done it before.
- Although it changes with the individual, it is important to start the process at least 4-6 months in advance.
- If you decide that you want to tackle some new scientific direction, then starting the process far ahead of time you will be able to produce a bit of preliminary data for credibility.
- By six months before the due date, early you should have a title, tentative titles of the specific aims, and a rough set of the approaches and themes under each aim. These details can change without largely affecting the big picture, and this allows you to decide the necessary preliminary work and to spot potential weaknesses in the overall proposal structure.
- Most people continue to tinker with a proposal *ad nauseam* and this might not always be good. If you focus too much on technical details, you can run the risk of losing the overall organization and clarity.
- An advantage of getting a draft done early is so someone else can read it and so you can be away from it for a while to clear your head. When you write and edit the first draft, you become too close to the arguments and have almost no ability to ask if the overall structure works. If you distance yourself from it for some time while others read it, you will probably have a better view of it when it is returned.
- It is highly likely that you will develop new ideas and have new insights into the problem as you write, so again, more time will allow you to think critically about those insights.

8. Who should read your draft proposal?

- Having a collaborator read your proposal might help a bit on some technical matters. However, they already understand why the proposal is important and believe that it is the right approach. As a consequence, they often don't notice when you fail to make convincing arguments. They also understand the details of your proposal, and will not get confused where a normal reviewer might.
- The best reader is someone like those who will be on the study section - smart and critical, but largely unfamiliar with the field. Give them a week or so to do the reading and make suggestions. When you have given them sufficient time to understand your proposal and make suggestions sit down with that person and address their concerns.
- "All readers' concerns are valid even if they are completely wrong." Don't debate them over their concerns. If the reader missed or misunderstood something in your proposal then you may not have emphasized your point sufficiently. The reader's comprehension is your responsibility as a writer!