Insider's Guide to Peer Review for Applicants

NIH Center for Scientific Review

To help new and established applicants submit better applications, CSR asked current and recent study section chairs to share their personal insights on producing a highly competitive NIH grant application. They responded with great enthusiasm.

Don't jump too fast into writing your application: Since the most critical parts are the summary and specific aims sections, write a one-page summary page with specific aims first and share it with someone who is experienced, has their own funding or—ideally—someone who has served on a study section. If you can't wow them, start again and use the time you saved to come up with some fresh ideas.

Propose something significant: It is a real turn-off to read an application that is basically a re-hash of a previous project with a new issue. The same goes for "me too" research. Identify an area of current controversy or importance within your field. Make it something that would interest more people than you and your coworkers. Will it be important to clinicians or other investigators? Are you dealing with key questions or controversies in the field?

Good ideas don't always sell themselves: Tell me why it's important up front in the background section, and I'll be ready to roll. Tell me what's known and what isn't known and how, after you complete your studies, you'll move the field forward or answer important questions. A lot of people really are unaware of how absolutely important it is to tell the reviewer from the beginning why it's worth doing. If you're seeking an incremental advance over what's known, it's essential to justify it.

Make it exciting: I love to see fresh, well-supported ideas that have a good hypothesis behind them that could really open up an area. And I find it both exciting and intellectually stimulating to encounter new approaches to major problems and research that could advance both clinical and basic science. Even if it's somewhat high risk, if it comes with a good hypothesis and you can test it, I'd find it very exciting.

Probe for mechanisms and seek new models. We need to know how something happens—not just what happens. With this knowledge we can affect outcomes and design something to prevent something from happening. If you don't know what's happening on the bench, you're not going to move to the bedside with any reproducible or knowledgeable treatment.

Avoid proposing to "collect more data." It might help you to set up the system, but if it is not critical to fundamental understanding, do not dwell on it. Although some experiments might take a lot of time to perform, they will not necessarily qualify as specific aims.

Be very clear and very concise about what you want to do, why it's important, and what you expect to get out of it. Keeping it clear
doesn't mean doing away with complexity. Just make sure your general sense and key questions come across very clearly ***throughout*** your proposal.

Don't assume too much: Not all reviewers will have the same in-depth, highly expert, knowledge you do. Avoid any unnecessary technical jargon, and write your application assuming it will be reviewed by intelligent scientists who have a breadth of knowledge around your area. So consider getting a researcher at your institution who isn't an expert in your field to read your application and tell you how well it flows.

Be brief with stuff everyone knows: Lots of people go too far describing routine laboratory methods, which just take up space and really distract reviewers. It gives the message that the applicant is not really as organized as they should be. New investigators, however, should make a little more effort to show that the techniques they proposed to use are within their capabilities.

Let your light shine: Don't be bashful in telling reviewers your important strengths both in your biosketch and in relevant parts of your application.

Don't be overly ambitious: Trying to cover too much territory with one application is perhaps the most common mistake newer applicants make.

Don't overstate the significance of your research: It's great if you can say your results could one day have an impact on treating or preventing disease. But don't promise more than you can deliver. You really need to make more than a general case for significance. Explain the specific significance of the particular question you're asking and how your results may fill important technical or knowledge gaps or otherwise impact your field.

Aim each aim: Lay out the rationale for each aim. Spend time on the Expected Outcomes, Data Interpretation, Pitfalls, and Alternative Approaches sections for each of them. The "expected outcomes" section shows you've got a logical strategy. The section on Data Interpretation gives insight into your depth of understanding the problem and the rigor of your proposed research. The Pitfalls section shows how familiar you are with the proposed techniques and methodologies. Finally, in discussing alternative strategies, you can give us confidence you are able to deal with the problems that arise when experiments don't work as expected.

Make your aims sing and harmonize: Quickly lay out the broad context, the scientific question to be addressed, including its significance, and exactly how you propose to advance understanding of your problem. Craft your aims carefully so reviewers will see both their individual and synergistic worth.

Pull it together: At the end of your research strategy section, have a succinct, one paragraph summary of what you intend to do, how you intend to do it and what it is going to tell you. Write it like a manuscript abstract. It is really helpful at the very end if I can get the take home message.

Focus your preliminary data: Insert a very succinct paragraph to explain what the preliminary data really tell you and how they show the feasibility of your proposed research. Make your application compelling by citing preliminary or prior work that shows the feasibility of each of your aims. Also, don't assume your reviewers will remember all your preliminary data from the significance section. If you have a lot, you may want to briefly refer to a key bit in your research strategy section.

Sleep on it: After you've written your application, reflect on the details and the big picture. Shedding unnecessary details and presenting a broader view of your proposed research may make it more exciting, particularly to reviewers who are not over-the-top experts in your field.

Don't test the waters to see how reviewers like your initial ideas or let them find the limitations for you. Find the limitations yourself and discuss them in the application.

Don't cram your application like a suitcase: I cringe when I open up an application that is wall-to-wall words. I also have a difficult time with numbered references (because they require readers to constantly flip back to the reference section). I love to see spaces between paragraphs, spaces between sections, and figure legends I don't need to bring up the PDF magnification to 200x to read. Try writing your application without using the maximal margins and smallest allowable font.

Proofread your application. Better yet, have someone else proofread it!

Know your audience and pitch your application to it: Explore CSR's study sections in your area. After checking out the guidelines and rosters online, request one you think could best review your application. Contact one of CSR's scientific review officers if you are unsure.

Seek guidance from NIH program directors before and after your reviews. They can help you focus your proposed research, understand your reviews and guide your next steps.

The key word is persistence. Half the applications reviewed are not discussed. So don't despair. You're in good company. Go through your critiques with your investigators. If there's a fatal flaw, stand back and then decide the best route to take next time. But usually the weaknesses are fixable. Make a stronger application and re-submit.