

Guest Editorial

NIH Research Grant Writing: Tips and Strategies

There are five essential requirements for obtaining funding from the NIH for basic research (e.g. R01 and R21) and applied research (SBIR/STTR): (1) the project must have a large impact on public health; (2) there must be a convincing plan to achieve that impact; (3) there must be a proven team to execute the project; (4) the proposal must be written in a clear and concise manner and (5) the reviewers should have adequate expertise to review your project (i.e. you must have some luck). These components are discussed in additional detail below:



1. *A successful project must promise a large impact on public health:* most grant projects have a long-term impact (for example, preventing dental caries). The immediate goal of the proposal must be to address a major question that is key to achieving the long-term impact (i.e. the results of the research will move the field forward in a highly significant manner). In writing the significance section of the proposal, you must clearly describe the high level roadmap that the field itself must follow in order to achieve the long-term impact and demonstrate how your project fits into that roadmap. This allows the reviewers to see the importance and context of the proposed specific aims, both in terms of what has already been accomplished and what will be accomplished in follow-on proposals.
2. *There must be a convincing plan for achieving the specific aims of the proposal:* to this end, the reviewers must be convinced that the proposal is feasible and likely to succeed within the proposed time and budget. Thus, preliminary data are very important, even if the grant solicitation does not call for preliminary data (R21, SBIR/STTR). These data should reduce all key risks involved in the proposal. There must be innovation in the plan to achieve the specific aims or within the specific aims themselves. For example, the innovation can be technical or the innovation can be a novel treatment method being developed. While it is not always possible to have high technical innovation, reviewers like technical innovations, especially when such innovations can be used in other fields as well. In addition, the overall plan for achieving the specific aims must be logical, coherent and provide important results, whether the hypotheses are supported or rejected. Careful wording of the proposal's hypotheses in this light takes considerable thought on the part of the investigator.
3. *A proven team must be in place:* all aspects of the needed expertise in the proposal must be covered by the team, as a whole. This is sometimes best accomplished by having a consultant or collaborator who is the most respected person in the field. It is fine to have younger and less well known collaborators; but only if they have a unique talent that cannot be found elsewhere (i.e. they developed a novel model system that you would like to use in your studies). If all of the needed expertise is covered by the principal investigator's group, then a collaborator is not needed.
4. *Write the proposal in a clear and concise manner:* this is the most difficult aspect of grant preparation and requires considerable effort. The first sentence should state the goal of the proposal itself. For example, 'this is a proposal to investigate the mechanism of toxicity of fluoride to bacteria.' This allows the reader to put subsequent information into the correct context. Tell your story in a logical and simple manner. Use a topic sentence for all key paragraphs. Guide the reader through your thought process by using transition sentences when going from one idea to the next. Write the proposal at a 10th grade level. Your expertise will come through in the ideas, not through complex writing. For the specific aim, it is usually best to express each one as a hypothesis to be tested. Always have a final draft prepared 2 weeks ahead of the deadline and ask for critical comments from trusted colleagues. This will prevent poor writing due to rushing. Finally, be aware that many scientists are well funded based on their scientific accomplishments, as opposed to their proposal writing abilities. In fact, some top scientists get funding in spite of poor grantsmanship. So, if you plan to study successful proposals, be sure to study proposals from at least four different successful people in order to reduce your chances of copying bad habits.
5. *Bad luck can be a factor:* sometimes a reviewer will either not have the appropriate expertise or will simply not like a project. There is nothing that can be done about this. However, the better the writing, the more accurate the reviewer comments will reflect the true weaknesses of your proposal. This is important feedback that can often be applied to future proposals as well as a resubmission of a current proposal.

The applied research grants (SBIR/STTR) are for small businesses that are applying academic or other research to product development with the goal of selling the product. To find out more about NIH SBIR/STTR grants, go to: <http://www.niaid.nih.gov/researchfunding/sop/pages/sbirsttr.aspx>. The above five points apply the SBIR/STTR grants as well as basic research grants. However, in SBIR/STTR grants, you also need to have a short paragraph that establishes a business model for your intended product. The product can be software, medicine, a medical device, or other product that is designed to greatly improve upon current treatments in terms of health outcomes and/or quality of life for patients. To see what kind of projects are being funded by the NIH, go to: <http://projectreporter.nih.gov>. This site is a search engine of all funded NIH projects. It is very useful for those with little experience in obtaining NIH funding. Additional information on grant writing for all grant types can also see the blog at www.sbir-sttrgrantshelp.com.

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