HOW TO INCREASE YOUR FUNDING CHANCES:
COMMON PITFALLS IN MEDICAL GRANT APPLICATIONS

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ABSTRACT

This commentary identifies 16 items to consider when trying to achieve success with grant applications.

After spending weeks writing a grant application for a peer-reviewed competition, and several months worrying about it, you may receive a letter informing you that you have failed, with a couple of your anonymous colleagues telling you how stupid you actually are. This happens to all of us. Most of us take several weeks to recover from the humiliation, and try to resubmit for another deadline or to another agency.

With the rates of funding steadily declining, it has become more difficult to secure peer-reviewed support for medical research. This means that you have to do the best job possible, since every detail may count in this photo finish race. Having served on Canadian Institutes of Health Research (CIHR) and National Institutes of Health (NIH) grant committees, and mentoring young clinician scientists and postdoctoral fellows in a large academic center, I was encouraged by several colleagues to revise a previous version of this paper (1). To make this effort practical, I have chosen to focus on common errors that I have encountered when serving on grant committees.

Time
Start early! Grant applications always take more time than you think. I often see people striving to get signatures and photocopies at the last minute.

If you do not allow sufficient time for the intellectual process to percolate, you may not defend your arguments and techniques optimally, and astute reviewer(s) can punch critical holes in them. In addition, it is more likely that you will miss typographical errors and include wrong or incomplete references when time is short. These are all markers that are picked up by experienced reviewers.

In-house review
In some institutions, grant applications will not be signed by the director of research without an in-house review of the grant application. Even if you reside at an institution that does not demand this step, you should not dare to proceed without three to four colleagues reading your grant and telling you the truth! Choose these colleagues wisely, and try to ask at least two who have received a grant from the agency that you submit to. Even better, find someone who has served on a committee for that agency. And again, allow yourself enough time to address the points that your colleagues have made. If you get their response five days before deadline, you are unlikely to benefit from it! If your application was rejected before and you are resubmitting, it is even more important that a group of your peers tell you whether your revisions have addressed previous weaknesses.

In the past, I had examined at our research institute the predictive value of grant ranking by peers and the success in receiving funding from the Medical Research Council (MRC). During formal scientific review by three or more peers chosen by the principal investigator, the reviewers were asked to rank the grant proposal between 0 and 5 "as is" and "potential ranking" if revisions are performed as suggested.

During that particular competition, grants that were ranked lower than 3.9 (out of 5) by MRC committees were not funded. Twenty-seven proposals were submitted from our institution, and eight of them were funded. Grant proposals that were given "potential ranks" by the ad hoc reviewers lower than 3.9 had only a marginal chance of apparent success at the MRC (1/14 or 7 per cent). Grant proposals with a "potential rank" from the ad hoc reviewers of 4.0 or higher had a 55 per cent chance of eventually being funded by MRC (7/13) ($p<0.01$).

These data indicate that peers, chosen according to their expertise can help predict the chances of securing funding. If your grant is ranked by your peers at a level lower than the usual cut-off point of the particular agency you should rethink your proposal. To be helpful the internal ad hoc review must occur sufficiently early to allow for effective revisions.

Choosing co-applicants and collaborators
If you describe techniques outside of your field, then you must have co-applicant(s) or collaborators who have the required expertise. Reviewers will scan your curriculum vitae, and if they are unconvinced that you can do what you say you can do, then you will strike out. The co-applicant must write the section pertaining to the area in which you have little or no expertise. Expert reviewers will easily recognize jargon or less than optimal writing by someone who is not in that particular field.

Suggested reviewers
Many agencies ask you to propose the names of reviewers. In most cases some people from your list will review your application in addition to several from a general list of experts maintained by the agency. Identify reviewers who can comment on the proposal in a meaningful manner.

Some colleagues will write enthusiastic reviews about your history and career, almost starting from toilet training, but they may be superficial and negligent on the grant application itself. This is not helpful as such a review, even if rated "excellent," may have little weight in your overall rating.

Body of grant application
Most grant committees carry a tremendous burden, and the members are busy people, so you must drive your message home clearly. I like reading applications that have a "preamble" that tells me up front what is important about this protocol and about this group.

Do not be shy to say, "Our group is the only Canadian… to explore this…" Most applications start with "introduction, background, methods," and reviewers may have to read eight pages before they understand where your fire is. If they know it up front, they may read your application with more passion. This can be also remedied by a strong summary page, which is read by all committee members. Hence spend quality time on your summary page.

Pilot data
Your credibility increases when you can provide pilot data illustrating that this is your field, and that you know how to handle the issues or techniques. Your pilot data should show sparks of the promise to come later. Moreover, when your research is in a totally new direction or an innovative hypothetical framework – preliminary data may be needed to convince committees that this is not a fishing expedition.

Sometimes, you can produce your pilot data by chart review or a short laboratory experiment. Even if it is a new grant, the section on "relevant work by the applicant" should include pilot data whenever possible.

Hypothesis
It is surprising how many applicants still do not state a clear hypothesis to drive their investigation. Sometimes, the hypothesis is only suggested in the text, while often it is unclear. One of the worst comments that you can get from a reviewer is that your work "is not hypothesis-driven".

Statistical analysis

It is not sufficient to list the statistical tests that will be used to compare groups. You must justify your chosen sample size with the effect size sought and power. This is not just because the sample should be large enough to identify the difference that you have chosen, but also because the sample size defines your budget.

Budget

Budget justification is a section that has unlimited space. Justify everything you request, including materials, expendables, and human resources. Be aware that poorly justified items are cut, even from top-ranked grants.

Writing style

The members of grant committees review many applications. They enjoy those that look good and are easy to read, and they agonize over those with endless paragraphs that are difficult to follow. The presentation may affect their judgment about overall acceptability.[2]

How detailed should I be?

Do not fill the space with detailed experiments. If you have published studies, include them as appendices and refer to them indirectly. It is OK to say, "The details of these experiments have been previously published by us. Briefly…" If your application is a new grant and you have not yet published the technique in question, create an appendix with the details of how many mL per test tube, which dilutions were used, etc. Too many technical details in the application distract the reviewers. They may see your trees, but not your forest.

Finale

Many people finish their applications in the last sentence of the methods and analysis sections. Always try to finish with an upbeat tone. The simplest way is to write a "significance" section, where you can repeat key sentences. Remind your reviewers, who might have dozed off in the methods section, how important your work is.

Clinical relevance

For grants dealing with both patient-based and basic science research, the clinical relevance may be important for the committee. A few government agencies rate science separately from relevance. They define the latter as their mandate or scope. If you apply to such agencies, you must ensure that your topic sits at the eye of the storm. For some agencies with a broad mandate (e.g., NIH, MRC) there are no guidelines for clinical relevance. For these agencies, selling the potential clinical importance of your protocol will improve your chances of obtaining funding.

Time table

Be sure to include a section on "time table." Use this section to tell your reviewers how you are going to use your time. The more specific you are, the more impressed they will be regarding your knowledge, expertise and organizational skills.

The science

The rigor of the science in what you intend to do is still amongst the most critical elements in the grant. Common pitfalls include the omission of theories other than the one that you have chosen, so be sure to acknowledge and discuss them briefly. Old references that neglect new work indicate that you have done a superficial job. A common pitfall in patient-based research is the neglect of confounders that can also affect the outcome in question. A section entitled "Rationale for Methodologic Choices" should help to answer many of the questions that reviewers may ask.

Resubmission

Due to very low funding rates, almost all of us experience rejection at some time and need to resubmit to pursue funding. Upon resubmission it is critically important to address all points made by the previous committee and its external reviewers.

When a grant is returned to the same committee, it is likely that at least one of the committee members present at the last review will be assigned to it. Even if not, there is a high probability that one or more internal reviewers are still on the committee. This "committee memory" can be positive if you fully and meticulously addressed all previous concerns and criticism. If you did not do a good job in responding to comments and revising the protocol this "memory" may work against you. It is my

personal impression that committee members are gratified when previous comments have been addressed appropriately and in detail, and this eventually affects rating.

Epilogue

Rejection is a traumatic event. We may feel unappreciated; we may feel stupid and worthless. But we are not! And if you do not believe me – ask your mom.

REFERENCES

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