Presentation and Publication Skills: How to develop a protocol and write a grant

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ABSTRACT

In this education paper, we want to give some advice to aid in successful scientific grant writing. Besides defining an important research hypothesis and how to support this hypothesis, there are also technical aspects in grant writing that need to be fulfilled. Therefore, read carefully the requirements before starting to write the proposal. You must also determine what skilled people, equipment and consumables are needed in order to reach your research goal. It is advised to develop a timeline with the key milestones (background, partnership, budget, writing, peer-evaluation, submission). Spend enough time on the summary, title and acronyms, in order to make them attractive to the reader. The research objectives must be SMART (Specific, Measurable, Achievable, Realistic, Time-Sensitive), not DUMB (Diverse, Unmeasurable, Mediocre and Basically-Unachievable). In the end, understand that also non-experts will review your grant and therefore they should be able to understand what your goals are, but also at the same time add sufficient details of your proposed methodology to convince the experts.

Learning Objectives

Key learning objectives for this paper, include how to:

- avoid the most important barriers to successful scientific grant writing.

- improve the chances of success in obtaining a grant relevant to the field of (clinical) nutrition.

- determine which important questions you must ask yourself before even writing the application.

- organize an efficient timetable so that you submit an excellent and relevant application before the deadline.

Key messages

After reading this paper, you should

- read the requirements for the grant and know the rules before writing anything.

- determine what skilled people, equipment and consumables you need in order to reach your research goal.

- develop a timeline with the key milestones (background, partnership, budget, writing, peer-evaluation, submission).

- spend enough time on the summary, title and acronym, in order to make them attractive to the reader.

- write research objectives that are SMART (Specific, Measurable, Achievable, Realistic, Time-Sensitive) not DUMB (Diverse, Unmeasurable, Mediocre and Basically-Unachievable).

- ensure that non-experts are able to understand what you write whilst the selected details of your proposed methodology convince the experts.

Introduction

Getting a grant for your scientific project is not easy. In fact, it never has been as it is a competitive process and it just seems to get tougher every year. In addition, clinical trials or "wet lab methods" for fundamental research in the field of nutrition and health are expensive and funds are limited. There are several public and charitable funding bodies but, whatever the type of "call for applications", certain rules must be respected in order to get to the top of the list and be selected for granting. This paper will tell you what you need to do to get to the top of the list.

Objectives of this paper

This section will describe the most important general threats in scientific grant writing, and discuss how to counter them. We will describe how to improve the process of writing, by considering the criteria by which applications are judged in the field of (clinical) nutrition. We will emphasize clinical studies whose criteria are, perhaps surprisingly, very similar to those established for successfully writing a scientific paper (see the related section).

Key questions to be addressed before the application

Ask yourself the question "What do I need?". It will get you to the point very quickly. There is no doubt that it takes a lot of time to put together an excellent application and it may take precious hours away from your current ongoing research activities. If you really want additional funding to achieve your research objectives, then you will have to work out what you miss and what is preventing you from reaching that admirable goal. You may lack skilled co-workers, special equipment, or laboratory consumables for assays and tests.

Secondly, ask yourself "Do I really have enough time and help from others to actually submit an application?". At the very least, you will need help in the form of a peer-review process at your institution before submitting the application. Some projects require an internal or external partnership. The timeframe will be different if you have no science partners or if you have to choose and deal with other partners. For all projects, the partnership must be justified. Do not forget that if you are successful, you will have to work with your partner, and therefore be in agreement with each other regarding the desire to collaborate and establish specific roles and responsibilities. You have to be sure that together, you and your partners cover all of the required expertise and techniques. The first step of "searching for a partner" is so important and is often time-consuming.

What to do before writing?

Before you even start writing your grant proposal, read the instructions and the rules of the funding agency.

Two types of grants should not be confused with each other:

- general/non-oriented/investigator-initiated grants.
- "calls" which often address specific questions or relate to specific themes.

For non-oriented grants, you have to write the question <u>and</u> the answer, considering the guidelines and missions of the funding body. If the "calls" are questions, your proposal will set out to support an answer. The call must relate to your research activity, publication record, and background to ensure your credibility. For example, how well can you answer all aspects of the topic question? How specific and excellent is your project answer for the question which is being asked? Many funding bodies require some preliminary results that show the proposed work is feasible and that potential problems and appropriate alternatives have been considered.

Before you start writing, make sure you have all of the supporting guidelines for applying "at your fingertips". For example, you could visit the ESPEN website to study the form which is used to apply for an ESPEN research fellowship (https://www.espen.org/research-fellowships). For some calls, very specific conditions are applied, such as "the use of existing data, biobanks, or cohorts", or "to take into consideration the impact of age, sex, gender and ethnic differences in the research purposes", or even to impose some "key principles and methodologies for data managements". You need to check if you are fulfilling all of the requirements in your proposal.

The budgetary component is <u>very</u> important, and must be considered before you start writing the application, and should not be added as an afterthought at the end. After all, the things you propose to study in your research proposal depend on how much money you allocate to each part. Remember that "honesty is always the best policy", so please state clearly if you have other funds which can complement the amount of money you require for your proposal. It may be tempting to omit this in order to have some extra "money in hand", but we advise not to do that.

The amount of money available for a call and the maximum amount of money allocated per project, will give you an idea of the chance of success and/or of the adequacy of the budget to meet your objectives. Imagine you have €198,000 in reserve and can add that to a call for €350,000 in order to do research which will cost €520,000, then you are more likely to persuade the funding assessors that you are serious, capable, and realistic!

Advice for writing

You will have to spend enough time working on the <u>summary, title, and acronym</u> in order to make your proposal really attractive. In some short, sharp sentences you have to prove the originality of your ideas. For example, you must answer the following questions:

- What is this project about?

- How is it unique and interesting?

- Why is it useful and necessary?

- Is this the right team, with the right ideas?

All of these questions can be used for self-evaluation of your first draft.

The lead paragraphs must contain powerful statements, followed by the argumentation (not inversely). The guidelines always state that the objectives must be SMART, not DUMB (see above). Make sure yours are SMART.

Many people find that a very useful way to structure the application is as follows:

- Use numerical structure for required sections.

- Make your timetables into a Figure which describes the timetable and protocols with nice clear legends. It is important to make it so clear that "a man galloping by on a horse" can understand it.

- Respect the maximum word count, don't use a very small font, and space the text nicely.

- Avoid repetition between sections. Just say it once and later on "see above, Section 3.4.4" (for example).

- Write simply. Alternate with long, medium, and short sentences. Avoid sentences of 60 words or more! They are like ox-carts which lumber across the page.

- Put the budget justification in an easy-to-read format (e.g. a table).

- Select a few references which are adequate and recent.

- Annexures, if needed, must be restricted to support what you are saying. They should <u>not</u> contain key information which is needed in order to understand the project itself.

Please remember that the evaluators are volunteers, and busy people who are sometimes, but not always, key experts in the field. Therefore, your text should be comprehensive for non-experts, but sufficiently detailed (experimental protocol, methodology…) to convince the experts. Both types of evaluators work on the assessment panels so make it easy for them to come to a swift and favorable

conclusion. Preliminary data are often a good way to convince them about the feasibility of your project. A clear indication of the risk/gain level is a plus. What you might say is that "based on our knowledge and track-record, this project has a 70% chance of generating important information which will move the field forward. There is a 30% chance that it will show nothing but that is valuable because future researchers can look elsewhere".

Get help from the administrators in your institution to write the administrative part (e.g institutional performance/ranking metrics); make time for pre-evaluation by your colleagues (who were successful…). Always consider project calls to be competitions. One strategy could be to simulate possible competing proposals and to ask the question "How strong will my proposal be in comparison with other submissions?". Keep the timing and the sequence of actions (see **figure 1**).

Specific advice for clinical trial projects in nutrition
As discussed before, the design of a study is very important and will be one of the key criteria for the selection or rejection of the project. Firstly, you must get ethical approval to perform the proposed research. A letter from the Research Ethics Committee with the approval number is often required in the "calls", because otherwise there may be delay while it is obtained. This step must be included in the timetable. Ideally, if you have already got approval, your trial can be in public databases like in CLINICALTRIALS.GOV. All the information related to ethics (informed consent, gender- or social equality…) must be put at least as an annexure, or summarized in a table.

In a clinical intervention trial, it is necessary to include an adequate control or placebo group and to elaborate the rationale to propose a single or double blinded study. When you refer to the methodology (choice of biomarkers, use of questionnaires…), try as much as possible to use standardized and accepted methods that are reproducible and validated. If it is not the case, a phase of validation should be included as a step in the project. A simple diagram with the study design is often illustrative. Do not forget to use appropriate statistical analysis to calculate the power of the study and the size of the groups necessary to show a difference if one truly exists.

The project must clearly indicate the primary and secondary outcomes. Alternatively, you should justify why you consider it as a "proof of concept" project, with more emphasis on novel aspects versus existing protocols. More and more calls or funding bodies require a section related to the data management plan and the future availability of your data. The impact plan is part of the evaluation criteria.

Summary

The most frequent causes of "rejection" or of bad evaluation of a project proposal are

- The hypothesis is absent or not clearly stated.
- The project is far too incremental and does not envisage a 'step change'.
- The project lacks novelty. It is a "me too" project.
- It contains new ideas, which are not supported by preliminary data (supportive material).
- It is too ambitious a project—given the time and resources requested.
- The sample sizes are not justified and have inadequate power statistical calculations.
- The proposal has methodological weaknesses, or a lack of (or inadequate) controls.
- The applicant and/or the team do not have a strong-enough track record.
- The project will take place in an environment with insufficient experience in the field.
- The impact on health, society & etc. is unclear.

The format of a project proposal also guides the evaluator so make sure that you avoid:

- Writing only for specialists in your research field.
- Mismatching the proposal to the criteria requested for in the call.
- Submitting a version with errors or bad presentation (due to lack of time).
- Presenting an inadequate budget (and justification).
- Skipping the impact plan.
- Describing your role and contribution badly (the use of graphical Gant and Flow Chart is often mandatory).
- Giving only a few methodological details.
- Having repetitions/redundancies between sections.

References

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Figure 1: Proposed sequence from creation untill submission of a project

Background work

Partnership*   Budget   Writing   Peer-evaluation   Online submission

Funding bodies
Eligibility
Guidelines (careful reading)

Be confident in your partner
All must be justified for a well-defined role (not only reputation)

Start soon and save !

Deadline
Avoid last minute submission!