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## ICU Volume 12 - Issue 2 - Summer 2012 - Matrix

### How to Get a Research Grant: Tips From an Insider

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**A successful research grant application may represent an important step in the career of professionals working in the intensive care medicine field, especially in academic institutions. Grants are needed for launching and keeping research projects, as well as for buying equipment for the laboratory or initiating a clinical trial. Ideally, grant applications should not be driven by ambitions of getting a chief position in an academic institution, but rather by the real need and motivation to perform highly innovative research. Successful grant applications will certainly push one's career, but they should primarily be seen as a chance to put a project into practice.**

This short overview is intended for intensive care professionals who are still novices, and have minor experience with the grant application process. The recommendations herein represent the very personal experience of the author as an applicant (both successful and unsuccessful) as well as a referee of grant applications in Germany and Europe.

#### What Topic is Worth Investigating?

As soon as you start writing a research grant application, the object of research must be exactly defined and must have been comprehensively discussed with your group. Ideally, you and your team already know the topics to be addressed and the questions to be answered long before the application. If you have more than one question, make sure that the most important one is evident in the application, so that referees easily recognise the focus of your proposal. A straightforward, well-focused proposal is worth granting support.

#### What are the mechanism?

Research applications often aim to describe the effects of therapies or interventions on organ systems or clinical outcomes. Descriptive works are certainly necessary and extremely important for the intensive care community, since they provide us with information about treatments. However, as far as possible, you should consider shedding light on the mechanisms behind the effects. Referees usually prefer, and are prone to recommend acceptance of, research proposals that try to elucidate why and how a given effect occurs, ie. research projects with a mechanistic approach. This is especially true when the project shall be conducted in a laboratory. Referees tend to classify research projects dealing with genes, cells and tissue as mechanistic, even if this is not always the case. Accordingly, I have observed that research in whole organisms, e.g. animals and patients, is usually classified as "not mechanistic enough". Of course, such procedure is not correct, but many fellow referees are highly biased and do not correctly identify the mechanistic potential of "whole organism research". In fact, the micro-behaviour of genes, cells and tissues may not be enough to describe the macro-behaviour of complex systems, but most referees seem to ignore this completely. Thus, I highly recommend including mechanistic aspects in a research proposal whenever possible. Such recommendation does not imply that descriptive research will not be granted financial support, however. The degree of innovation and the importance of certain descriptive works are so high that they will certainly be recommended by reviewers.

#### Experimental or Clinical Research?

Medical evidence is based on clinical not experimental research; therefore, the chance of clinical projects being granted financial support should be proportionally high. Nonetheless, the quality of clinical research proposals is often not as high as their laboratory counterparts. Obviously, when referees have to evaluate applications with disparate quality levels, they will recommend the one with higher quality. Accordingly, clinical research may have a slight disadvantage compared with laboratory work in programmes that accept both experimental and clinical applications. I recommend that applicants make sure the institution responsible for the grant explicitly encourages such kind of application. However, even in such cases the evaluation may be biased towards laboratory research. Ideally, clinical research applications should be sent to institutions or programmes that specialise in clinical studies.

#### Am I Experienced Enough?

As a rule of thumb, the higher the budget of an application, the more experience that is required from the applicant. This is certainly disappointing for younger researchers whose publication track records are usually weaker than those of older researchers. One must understand that granting institutions consider it safer to approve the application from a researcher who has already shown he/she is able to conduct research projects successfully. In view of that, and provided the call for applications is not addressed to beginners, I recommend the following:

- a) apply for a sum that is proportional to your experience;
- b) consider sharing the project with a co-applicant who has a stronger publication track record and more experience than you; and
- c) present data from pilot experiments to show that you have already addressed the issue and are able to perform the study. Put forward that all

you need is a bit of money to conduct a promising project.

### **Getting Together: Networking**

The importance of collaboration among researchers cannot be emphasised enough. Beginning at the local, intra-departmental level and going beyond national borders, collaborations can improve the quality of research enormously. Due to fear of concurrence, lacking self-confidence, shyness, or a combination of those, some applicants tend to reduce their work to a kind of “one-man-endeavor”, instead of seeking help and advice. Even if a group leads its field of research, or a researcher is brilliant, both can still improve aspects of their research proposal when they invite other colleagues to collaborate with them. Institutions that support research are glad when they see that authors are seeking networking. I myself neglected networking for a long time but, fortunately, I came to appreciate the importance of collaboration a couple of years ago. In my experience, collaborations can be very fruitful and push your own and the collaborator’s research to another level of quality. However, when applying for a grant, the role of partners must be well defined so as not to give the impression that the applicant just wanted to obtain political support. This can be accomplished by providing letters of intention from your collaborators.

### **How to Write Your Grant Proposal**

Institutions that support research usually have their own rules regarding applications, and offer templates in which specific topics to be addressed are precisely defined. You must comply with such rules, and obviously also observe the deadlines for application, otherwise your proposal will not be considered.

Requirements for proposals may differ among institutions but referees will expect applicants to address the following issues:

- 1) Provide a highly qualitative revision of the topic you have chosen – A short review pointing out the most important advances and showing that the application is up to date can be a good start;
- 2) State clearly which issues have not yet been addressed and why you have chosen that particular issue;
- 3) Always state the hypotheses of the study and identify them clearly in the text – A precise formulation of remarkable hypotheses will help to show that your proposal is straightforward and focused, and that you can set priorities;
- 4) Be sure and show that you are using appropriate methods. In case of less modern technology, you should justify your choice;
- 5) Show sample size calculations – You must show that the number of experiments is enough to address the hypotheses, as a means to justify the amount of work and money applied for in the project. Also, you have to avoid more experiments than necessary, since this has ethical implications from the animal welfare perspective;
- 6) Define a feasible research schedule – You are expected to deliver the results of your project within the proposed schedule. A realistic time line is essential and you have to see the grant as a contract with the institution supporting your research. Obviously, if things develop differently than you expected, you will have to apply for an extension of the research period; and
- 7) Define a realistic budget – Referees will not expect the applicant to calculate the requested amount of money with precision of cents, but a serious proposal will list materials, devices, salaries, services etc. in a plausible way. While some institutions may require you to justify some costs and give you the chance to correct the calculations, others may simply reject your proposal due to an unrealistic (too low or too high) budget.

Another extremely important aspect is the formal one. Much attention has to be paid to grammar, spelling and the style of the text. You should ask a colleague to revise the application if you are not a native speaker or if you have difficulties in the language in which you are writing the proposal. In the case that the proposal has to be written in English, professional help for editing and revision of scientific texts is available on the web. I have used such a service in the past, with good results. Finally, it is important to stress that a straightforward text will help referees to retain the key issues of a proposal.

### **Increasing the Chances of Success: Preferred and Least-Preferred Referees**

If you feel that some referees may be biased, for example due to competition in your field, you should identify them in a cover letter accompanying the application. Normally, granting institutions allow applicants to exclude referees based on concurrence criterion. Also, you can suggest possible referees for your application, but be sure that they will be impartial. By suggesting former collaborators, you will leave a bad impression and make the choice of new referees difficult for the granting institution.

### **Have You Applied for a Similar Grant Before?**

If you have submitted the same proposal, or even just part of it, to a different institution, you have to declare this. Some institutions exchange information on applicants, and members of grant decision committees often serve more than one institution. Referees may also be asked to evaluate proposals from different institutions. The increasing cross-communication among grant institutions, even across continents, amid failure to report multiple applications may lead to rejection of a proposal.

### **We are Happy to Inform That Your Application Has Been Accepted**

After long arduous work, you have finally received the confirmation that your application was successful and it is time to celebrate. Sometimes this confirmation will arrive relatively late in respect to the planned work schedule; thus, you have to start immediately in order to achieve the results you agreed with the granting institution, within the time frame proposed. If you foresee that the work schedule is not feasible, you should

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contact the granting institution as soon as possible and apply for an extension. Normally, members of the grant decision committee will take the decision to extend the time frame as long as they are not associated with further costs for the granting institution. Occasionally, referees will be asked in that respect, but they are experienced with research and know that things may not work out as originally planned. In order to maintain eligibility for new financial support in the institution you were accepted at, you will have to submit a detailed final report. In case you obtain support from governmental research granting institutions, and subsequently fail to submit a thorough report, this may lead to a request of reimbursement of the sum received. But do not worry about that, as long as you have conducted serious research, you will not get into trouble.

#### **We Regrate to Inform That Your Application Has Not Been Selected**

Unfortunately the decision regarding your grant application was not favourable, in spite of the work and time you have spent on compiling the proposal. Take your time and try to identify the reasons that led to the rejection of your application.

Also, if you did not get specific feedback from referees together with the decision, request this formally. If the referees did a good job, the reasons for the rejection will certainly be useful towards rewriting the proposal and trying again at another funding institution.

Reasons for a rejection are not always clear.

Accordingly, high quality applications can be rejected if the budget is tight or if concurrence is too high. The ranking of proposals and selection of those worth being supported is not always an easy task, so if yours was rejected, it does not necessarily mean it is of low quality. Furthermore, referees also make mistakes and may have had a wrong impression of your project. I have applied for several research grants and many of them have been rejected. A couple of years ago, I experienced a curious situation in which one of my applications was rejected and the referees classified the proposal as: 1) not original,

2) having low chance of success, and 3) having low probability of acceptance for publication in a renowned intensive care journal—in other words, a destructive evaluation, which would mean that the project had very low quality. After reflecting, I took the decision not to change the proposal and submitted it to another institution, where it was accepted. Three years thereafter our group received a patent on the main idea of the project, and published the results in a highly ranked journal of the field with an accompanying editorial. In summary, do not let a rejection discourage you from improving your application— and keep trying!

Published on : Sat, 14 Jul 2012