Clinical review

The Royal Society of Medicine

Journal of the Royal Society of Medicine Open;
5(1) 1–5
DOI: 10.1177/2042533313505512

Strategies to secure surgical research funding: fellowships and grants

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Summary

Innovation and advances in surgery are entirely dependent on research. Fellowships and grants are the principal means by which surgical research projects are funded. However, these are scarce and highly competitive. This article offers guidance through the application process for the aspiring academic surgeon. Approaching the application in a timely and structured manner, seeking advice from current and previous award-holders and members of review panels, and obtaining preliminary data are key ingredients to success.

Keywords

research, fellowship, funding, grant, surgery

Introduction

Surgical research, whether it is in the form of laboratory science, clinical studies or technological innovation, is expensive. While many of the great innovations in surgery have been appropriately attributed to their respective pioneering clinicians and scientists, it is important to note that such advances might not have come about without substantial financial support. Today fellowships and grants awarded by either government-funded bodies or charities are the principal means through which surgical research projects are funded. Therefore, these applications are relevant to surgical trainees who aim to undertake a period of research in order to gain an insight into surgical innovation and develop critical thinking, and particularly, those who wish to pursue an academic surgical career.

Methods

Sources of information

Online sources including PubMed and the websites of biomedical funding bodies were used (please refer to references for details). Search terms included fellowship, funding, grant, research, surgery. We also searched the reference lists of the identified articles and our own files. Only articles published in English were reviewed. The final reference list was generated according to their relevance to the broad scope of this review.

Sources of funding

The major publicly funded research bodies are the National Institute for Health Research (NIHR) and the Medical Research Council (MRC). In 2008/2009, their combined spend on surgical research was less than 2% of the total research budget of £1.53 billion,[1–3] yet 30% of NHS patients received surgical care.[4] Furthermore, although funding from sources such as the NIHR is currently ring-fenced,[5] these resources are expected to dwindle in the near future due to the bleak economic climate and anticipated deep cuts in government funding. There are also a number of charities that fund surgical research, including the Wellcome Trust, Cancer Research UK, British Heart Foundation, the Healing Foundation and the Royal Colleges of Surgeons (Table 1). These funding bodies all offer competitive fellowship and project grants. For example, the Royal College of Surgeons of England offers one-year research fellowships for which the success rate is less than 20%. Moreover, with the exception of surgery-specific funding bodies, such as the Royal Colleges of Surgeons, the successful candidate is selected through open competition among applicants from all other medical specialties by selection panels on which there is usually a poor representation of surgeons.

There are currently no publications that specifically aid the aspiring academic surgeon to obtain funds for surgical research. In view of the challenges already outlined,[6] we aim to share our own experiences and provide guidance for the application of a surgical research fellowship or grant.

Fellowship versus grant

The difference between fellowships and grants can be confusing as the terms are often used interchangeably. In general, fellowships are awarded to support individuals whereas grants are awarded to support project initiatives, which may include a group of individuals. Typically, the aspiring academic surgical trainee seeking funding for a higher degree such as an MD or PhD should apply for fellowships. Post-doctoral trainees or consultants should apply for a starter, project or programme grant. In any case, the main principles that underpin a successful application for a fellowship or a grant remain the same.

The application process

Completing a fellowship or grant application is a major undertaking and can take several weeks or months. It requires multiple meetings with the proposed supervisor(s) and research services who should be warned in advance. The application must then be signed-off by a sponsor, usually the Head of Department of the host institute. Furthermore, the finance officer will require the completed application up to two weeks in advance in order to enter the details onto the institution-based grants application software. Therefore, the application form should be completed a minimum of two to three weeks prior to the deadline (Figure 1).

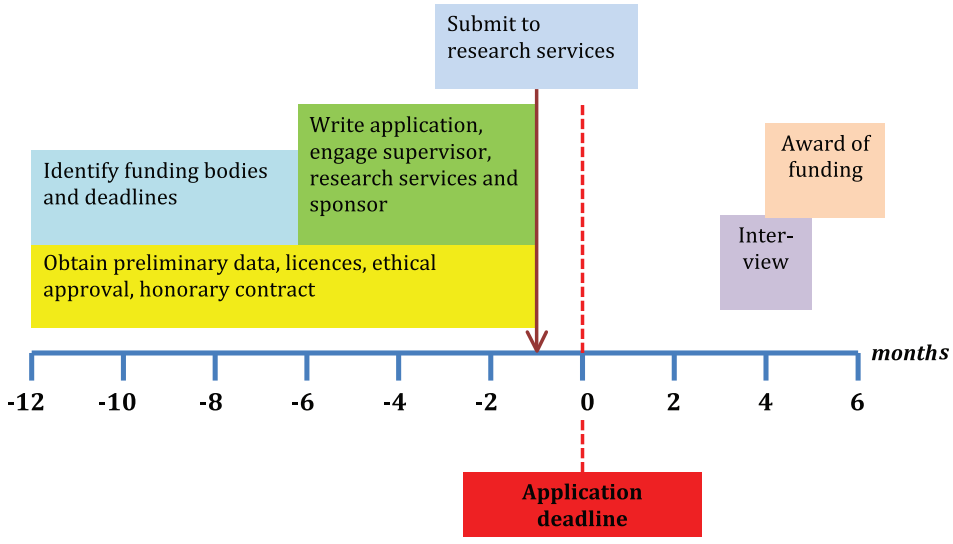
It is essential to gain some background knowledge of the funding bodies to ensure that the proposal meets their mission statements and aims. The funding body grant advisor should be approached if there is any uncertainty. Applicants should also closely examine applications from previous successful candidates and seek advice from experts. Constructive critique of the written application by award holders and experienced members of selection panels is invaluable. Furthermore, experts within the relevant field will be able to comment on the feasibility of the proposed project and experiments, including the rigour of methodological design.

The aim of the funding body is to select the candidates with the greatest chances of success in their proposed research. The submitted application is distributed for peer-review. Short-listed applicants are then invited for interview. Feedback may be provided either before or after the interview and usually includes constructive comments to improve the quality of the research project and highlight areas that need to be raised during the interview or for future applications. The selection process can be summarised by the assessment of the three Ps.

Table 1. Useful websites.

- http://grants.nih.gov/grants/grant_tips.htm
- http://www.wellcome.ac.uk
- http://www.mrc.ac.uk/Fundingopportunities/index.htm
- http://www.rcseng.ac.uk/surgical_awards_and_grants
- http://www.academicmedicine.ac.uk
- http://rdfunding.org.uk

Figure 1. Timeline.



Person

The applicant must possess a track record that demonstrates their commitment to an academic career. This includes prizes, presentation and publication record, previous successful grant or fellowship applications and career progression. Therefore, the prospective applicant is encouraged to participate in research and audit activities at their local hospitals or research departments with the aim of presenting at national or international meetings and publishing in peer-reviewed journals. It is also advantageous to demonstrate some experience in research such as through the Academic Foundation programme, a BSc (or equivalent) research project, or a higher degree such as MSc, MD or PhD, depending on the applicant's level of training and the type of funding being sought. However, for fellowship applicants, it is understood that not every junior doctor will have had the opportunity to pursue a year of BSc or participate in substantial clinical research very early on in his/her career. For example, the Wellcome Trust Research Training Fellowships specifically target medical graduates 'who have little or no research training, but who wish to develop a long-term career in academic medicine'. The eligibility criteria of most clinical fellowships include completion of MRCS but before Completion of Clinical Training. Therefore, the prospective applicant is advised to time their application in the context of their achievements to date and career aspirations.

A personal statement, including a brief description of the applicant's career aims, is often required. The funding bodies aim to select those who are intent on pursuing an academic clinical career and potential future leaders in their fields of research. Therefore it is necessary to be clear about what the long-term career aims are and how these may be achieved, such as through the Integrated Academic Training Pathway.[7]

Place

The host research institute must support the fellow or grant-holder by providing the infrastructure of supervisors, mentors, expertise and facilities.

Supervision. The applicant is strongly recommended to seek prospective supervisors, who themselves can demonstrate a strong track record in their clinical work, publications and grants awarded, as well as their experience in supervising clinical research fellows to the award of their higher degrees. They must be willing to play an active role in supporting and guiding the applicant through their research, including the inevitable and frequent periods of apparent failure. For those planning to undertake basic scientific research, the ideal supervisor is often a basic scientist. Whilst this is entirely appropriate, the trainee surgeon would also benefit from mentoring by a surgeon who understands and ideally contributes to the project, for example, by helping to formulate a research proposal with a translational output, provide patients samples and offer career guidance. Some trainees may wish to continue their clinical involvement by participating in a local on-call rota, to maintain their surgical skills, although this must not distract from the main research project. Most of the funding bodies prefer fellows to pursue full-time, or close to full-time, research during the funded period.

Institute. The institute should also house as many of the necessary facilities, including bench space, equipment and animal facilities, required for the proposed project as possible. If a particular technique or facility is not available, it is advisable to establish a potential collaboration to address these needs. Many surgical research projects depend on patient recruitment and access to patient data and samples. Establishing links with the relevant clinical centre where an honorary contract may be obtained will facilitate this. Ideally, appropriate ethical approval is obtained prior to the application.

The institute should also provide formal research training, including regular group meetings and research-specific courses, as well as the opportunity to attend and present in seminars, lectures and conferences. Some universities offer a transferable skills programme with courses on oral and written presentation, management and leadership development. Therefore, it is useful to find out what the institute can offer and convey how these resources will be exploited to help the applicant develop into a competent and independent researcher.

Project

The project must pose a research question that is new, have a clear translational aim and the potential for application to surgical patients in a wider context. The question must also be sufficiently focused, taking into account the resources, time and man power available. The tendency to be overly ambitious must be resisted in favour of more pragmatic and realistic targets. Conversely, the project cannot be too narrow and should incorporate a range of techniques to ensure a broad research training experience. The grant reviewers and the panel are looking for proposals that are at the cutting edge of the subject

area and objectives that can be achieved within the time scale of the application.

An abstract to summarise the background, project aims and how the research questions will be addressed is mandatory. A lay abstract may also be required as some review panels consist of lay persons. This section often serves as a reminder for the panellists prior to the interview and is therefore of utmost importance. The best abstracts are well-structured, with clear aims and consist of short and succinct sentences. There is a tendency to write the abstract hurriedly but this is one of the most important sections of the grant proposal and must be clear and concise.

In a separate section, the hypotheses and main objectives of the project including the supporting evidence are required. These must be logical and scientifically credible, well-defined and demonstrate an in-depth understanding of the field and relevant literature. Together with the abstract, this section must convince the panel that the research topic is clinically relevant to a surgical disease (however tenuous) and worth investment. Following this, the proposed plan of research is outlined. This must be rigorous, well-structured, logical and, importantly, succinct as there will be a word limit. A clear description of the proposed experiments should be presented together with an explanation on how they might achieve the study objectives and a time-line of the key milestones. It is understood that the experimental plan will change according to the data generated. Therefore, it would be useful to outline alternative experimental strategies, i.e. 'plan B'. This is particularly pertinent in projects that involve the development of a novel methodology where there is a risk of failure. The proposed research must be feasible within the proposed time-frame and budget at the proposed institution. Preliminary data will make the application considerably stronger and should be presented here. They will also inform power calculations, which are necessary to justify the numbers required in each experimental group, particularly if animals are involved. Proposals based purely on an idea with little or no preliminary data are rarely funded as they are considered too risky. Therefore, in the case of fellowships, the applicant should ideally have worked on the project in the prospective host lab to acquire the methodological background to satisfy the panel members at interview. Failure to formulate a clear hypothesis with clear aims and detailed methodology is the most common reason for rejection.

The applicant should prepare for the practicalities, such as the need to access patient data and samples or perform animal work. This may require an honorary contract at the relevant hospital, Home Office Personal and Project Licences for animal experimentation and approval by a research ethics committee. These take a minimum of several months to organise and would be ideal to have in place prior to the application.

Most applications contain a detailed financial section, which encourages meticulous project planning within a budget and time constraint. It is useful to study the funding policy as this varies depending on the funding body. For example, larger funding bodies like the Wellcome Trust cover 'full economic costing' (FEC) which includes university, infrastructural, supervision and support costs as well as salary and consumables, whereas others like the RCS may cover direct costs only, usually salary, some consumables and sometimes travel to attend conferences. The interview panel may ask the applicant to justify the amounts requested for certain aspects of research, such as animal costs. Therefore, it is advisable to discuss these in detail with the supervisors and finance officer at the proposed host institution as they will be able to advise on what costs are reasonable and save much time and effort.

The interview

Shortlisted fellowship candidates are required to attend an interview. This enables the funding body to assess the candidate's academic potential in greater depth. Preparation is the key to success. A good understanding of the research question and methodology is required, along with the relevant literature. Feedback from the original application might identify perceived weaknesses in the proposal that the candidate should be ready to defend.

The interview may be conducted by as many as 15 senior academics and clinicians. Normally two to three members of the panel will ask questions while the others observe and score. Candidates are often asked to present a short summary of their project. The availability of new data obtained following the application is always helpful. Questions may also cover general knowledge of research governance and the candidate's career ambitions. Given the limited time, provide succinct and focused answers that are understandable by a general scientific audience and more technical information may be provided on request. Candidates are strongly advised to justify their statements by citing the appropriate key papers from the scientific literature.

Conclusions

Success in obtaining fellowships and grants is critical to a career in academic surgery. Competition for research funding is fierce amongst medical

specialities, with surgeons receiving a disproportionately small allocation. The old adage of 'success feeds success' is no less a truism in the quest for research funding than in other walks of life. Success in obtaining one fellowship or grant will greatly improve the chances of subsequent applications. However, the reality is that most clinical academics experience a decidedly positive failure-to-success ratio and this is considered part of normal clinical academic life. Therefore, the applicant must not become too disheartened in the event of an unsuccessful application, but rather, realise that this outcome is the normal state of affairs, learn from the experience and most importantly, request feedback in order to improve the application for the next attempt.

Declarations

Competing interests: None declared

Funding: None declared

Ethical approval: Not applicable

Guarantor: JN and JKC

Contributorship: JKC and JS initiated the article; all authors drafted and revised the manuscript critically for important intellectual content and contributed equally to the manuscript

Acknowledgements: We would like to thank Mr Martyn Coomer and Ms Lizzie Cook of the Research Department at the Royal College of Surgeons of England for their advice and comments on this article

Provenance: Not commissioned; peer-reviewed by Amir Nisar

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