Funding academic research: Two sides of the coin

By Moira Cockell

Academics working in the life sciences have traditionally relied on their immediate colleagues and peers for help with the editing stages of their funding applications and research reports, but there is a climate of change in the air. Throughout Europe, competitive mechanisms for the allotment of funds are currently attempting to better integrate the enterprise of basic research within the interests of society as a whole. To get published and obtain funding, academic scientists need to devote more attention than ever before to explaining the broader relevance and impact of their discoveries. These changes pose new challenges for scientists who do basic research. Can they maintain their intellectual rigour, the freedom to question accepted theories, the room to pursue curiosity-driven investigations, while accepting that their paymasters are correct to evaluate their work in terms of its contribution to society's needs? Will their investment in the marketing aspects of their profession come at the price of less time spent actually doing research? Medical writers have developed skills and methodologies that could help basic researchers in the biomedical science disciplines to rise to the challenges they face.

Science and society or science in society?

The pursuit of science for its intellectual value used to be the exclusive realm of the gentleman scientist of independent means. Today, largely thanks to public funding, the idealistic dream of a career spent pushing back the frontiers of knowledge, has come within the reach of intellectually motivated young men and women from all social strata. However, in exchange, society rightly expects that its citizens should have a say in evaluating what they get in return. The post war explosion in the size of the scientific workforce reflects a broad consensus in present-day society, that economic growth and scientific pre-eminence are inseparably linked. Like it or not, the principle reasons that basic research receives significant funding from the public purse are economic.

Throughout Europe, the US and Japan, as well as in the developing and emerging economies of Asia, attaining the targets for research and development (R&D) expenditure is an important factor of economic success. All governments recognise that the contemporary 'knowledge society' is a complex system that can sustain itself only by continuing to generate technological advances. The effectiveness of industry's expenditure on applied research and development depends on the continued flow of basic research findings. It also requires that academia furnishes the private sector with a steady flow of trained scientists and engineers. In return, the pursuit of academic research on today's 'industrial' scale, relies on the transient passage of graduate students, post-doctoral researchers and junior group leaders, through the laboratories of its universities, technical schools and research institutes. Academic research in Europe is largely carried out by a work force employed on fixed short-term contracts and innovation is stimulated by fierce competition for limited funds and the constant turnover of personnel. At the educational, institutional and governmental levels, a sustainable research policy depends on keeping the training pipeline flowing smoothly.

The changing composition of the funding landscape

However, many academics pursuing basic research in the life science disciplines perceive that the flow of resources is being diverted towards more applied research. They claim it is becoming ever harder to find the resources to maintain a research group with the critical mass to make progress in a chosen area of study and feel deeply frustrated at having to spend an increasing proportion of their time on the search for funds. A recent survey backs up their subjective impressions, with evidence of long-term public sector under-funding in European countries [1]. Statistics from many national funding agencies as well as from charities and industrial foundations tell the same story; in recent years, the total number of applicants has increased significantly more than the funds available, while the proportion of quality ratings has remained stable or improved. The inevitable result is that the percentage of highly rated applications that are funded from such sources e.g. [2, 3] continues to decline. Incidentally, this also means that reviewing time allotted to individual grant requests has shrunk in recent years. For instance, assessment of European Molecular Biology Organization (EMBO) postdoctoral fellowship applications for the year 2004 reputedly allowed for an average of less than five minutes inspection per applicant in the first round of selection.

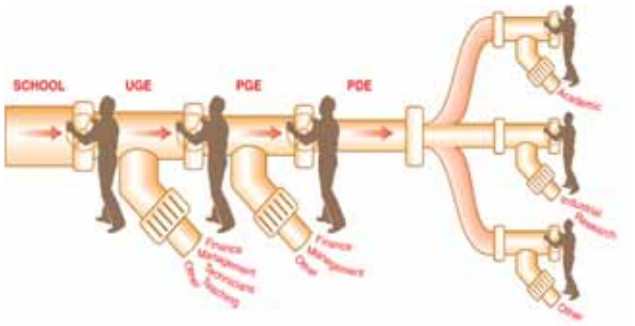
Over the last two decades, the European Union (EU) has become a major player in the distribution of research funds. Its funding policies reflect a general trend that is set to continue at both the national and international levels. In every research discipline, the emphasis has shifted to supporting translational research, i.e. the flow of intellectual capital from academia to the wider world. Nowhere is this shift more obvious than in the expensive, post-genomic, systems biology era of biomedical research.

The overall target for European R&D spending by 2010 is to attain 3% of GDP, with two thirds of that figure projected to come from private sector contributions. Some academic scientists fear the trend as a dangerous one that threatens to stifle curiosity-based research. Pragmatists see it as an opportunity to strengthen problem-driven fundamental research in the areas of most urgent concern to humanity. Many academics are simply still bamboozled by the administrative hoops they are required to jump through in order to construct, submit and execute an EU funded project.

European Framework Programmes

The main political instruments for the EU funding of research and development are called the Framework Programmes (FP). FP6 has overseen the distribution of 20 billion euros during its four-year term of activity. Its successor, FP7 recently entered its implementation phase having completed the two-year long procedure for adoption and approval by the European Parliament in November 2006. During its seven-year lifetime, it will administer EU budgeted research funds of 54 billion euros. In conjunction with the Competitiveness and Innovation Framework Programme, FP7 will focus on measures to reorganise the currently fragmented manner in which the bulk of other research funding provided by EU industry, international research bodies and the 27 Member States with national research policies, is spent. The political aim is to foster the EU industrial sector's ability to compete in R&D with the US and Asia. A major part of the plan to achieve this involves developing a more coordinated life sciences funding approach and improving interaction between the academic and private sectors. In theory, the goals of FP7 appear laudable: encourage sharing of resources and information; eradicate duplication of effort; avoid lack of critical mass, coordinate evaluation and distribution of resources to favour interdisciplinary approaches. However many academics remain sceptical, arguing that economies of scale achieved by polarizing basic research into 'Networks of Excellence' and 'Technology Platforms', will lead to large infrastructures from which it will be difficult to disengage when they become obsolete.

The future of European basic research funding does not look particularly rosy for the foreseeable future, but given that its status inevitably depends upon other economic indicators this should not come as a shock to us. Whether the increasingly structured EU policies will succeed in stimulating the new wave of private investment that is hoped for remains to be seen. In practice the changes in spending mix between the public and private sector are already upon us and they are not about to disappear. To avoid the distribution of the available funds becoming a lottery, scientists throughout academia urgently need to respond by better structuring of their approach to project management and the acquisition of funding. For academics used to the single-minded pursuit of their specialist interests it seems a daunting task, but those who have been most successful in exploiting the funds awarded in FP6, provide organisational models for what works best. There are also plenty of lessons to be learned from what hasn't worked.



(reproduced from [1] with permission)

Figure 1. The Training Pipeline: Key stages are identified as valves in the pipeline, allowing appropriate skills to be drawn off at appropriate stages. Action to tighten or loosen the pressure at these key decision pointswill affect flow positively or adversely.

UGE - Undergraduates, **PGE** - Postgraduates, **PDE** Postdocs

Future challenges and opportunities

The FP7 programme is a complicated entity. Understanding how to deal with it demands an input that tends to put many academics off proceeding further, at least while they feel they still have options to try for other funding sources. It is easy to be turned off by the jargon and the acronyms that abound even in the best online guides to EU research funding [4, 5]. Trying to grasp where concepts such as the European Technology Platforms (ETPs) and Joint Technology Initiatives (JTIs) fit in the overall scheme can make one feel like a confused elderly person who keeps asking "exactly where is the internet?" Nevertheless, in return for a small investment of time spent exploring some of the key information, there has been potential to influence the prioritisation of funding since the earliest stages of the political process. Academic researchers were invited to step out of their ivory towers and participate in the political debate about what gets funded. How many afforded themselves the 'luxury' of doing so is another matter.

Specific portions of the FP7 budget are allocated to four sub-programmes, through which the funds will be distributed. The 'Cooperation' sub-programme will assess requests for funding under nine different thematic areas (including Health), Some health-related research projects will also qualify for submission within the three other sub-programme categories ('Ideas', 'People' and 'Capacities'). Other funds have been set aside for the development of technology platforms, around 30 of which have been created to date. Among those related to the biosciences sector, the IME (Innovative Medicines for Europe) and NanoMedicine (Nanotechnologies for Medical Applications) platforms have been charged with developing strategic research agendas and mobilising additional investment in their area from public and private resources. Such technology plat- >>>

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forms will primarily be led by captains of industry, but the decision-making teams are also composed of influential representatives from academia, regulatory authorities and other stake holders. In certain cases it is estimated that the scale and timeframe of a public-private partnership's strategic research agenda requires a dedicated legal structure to achieve high risk, long term aims. In such instances, the European Technology Platforms will oversee the creation of Joint Technology Initiatives such as the one now in the process of creation for 'Innovative Medicines' [6]. The JTIs will be expected to compete for EU funding through the 'open competition' mechanism of the FP7 structures.

With the exception of a small number of individual awards granted through the medium of the recently created European Research Council [7], both the submission of FP7 applications and the execution of successfully funded Framework Programme projects will impose an enormous administrative burden. The risk of application failure is so high that the enterprise is not one to be taken on lightly. Based on the statistics for FP6, approximately 80% of FP7 applications received are likely to be rejected. Superimposed upon the obligate requirements for scientific excellence and the need to fit within the remit of tightly pre-defined guidelines defining the research topics that are eligible within each call for applications , there are quota assessments based on broadly political criteria. To be considered for evaluation, projects must involve research partners in a minimum number (usually three) of the different Member or Associate Member States. The more countries represented in a scientifically excellent consortium, the better its chances of being favourably considered. To be in with the best chance, a proposal must also gain consistently high evaluation scores for criteria such as transdisciplinarity of approach, gender balance of applicants and should demonstrate an element of academic-private industry partnership.

One of the major changes between FP6 and FP7 is that individual research consortium members will now have to draw up and administer legally binding contracts with each other as well as with the EU. Another is that many logistical and administrative tasks associated with funding application submissions will now be outsourced to third parties instead of being managed by EU staff. The project proposal and the subsequent progress reporting, needs to coordinate and harmonise the technical inputs from many people, each with expert knowledge in a different area. Throughout the many stages of the application and the reporting procedures there are mandatory templates for different document submissions. As the processes of application and intermediate reporting become increasingly geared to online submission, it is rapidly becoming obligatory to do so. The guidelines for completing applications correctly, amount to a paper mountain several meters high. The penalty for not completing all the paperwork within the tightly defined deadlines after publication of a call, is immediate rejection of the application. Simply put, both the benchmarks and the target audience for evaluating FP7 applications are somewhat different from the ones that most basic researchers have much experience of. Many academic scientists view the prospect of acting as an FP7 project coordinator with trepidation, having neither the time nor the inclination to invest in blending and distilling multiple inputs into a formally styled synopsis that is concise, accurate, comprehensible and appealing to reviewers from a broad spectrum of expertise. This remains true despite their growing acceptance of the need to communicate the value of their work outside the realm of their peers. In brief, academics (at least in the biomedical sciences) who are tempted to act as project coordinators are beginning to recognise that they can benefit from the help of intermediaries with analogous skill sets to those of medical writers with experience of the pharmaceutical industry and its regulatory procedures.

An affair that reflects badly on all players

"What have we learnt from Vioxx?"[1] is an article that should be read by everybody working in the pharma industry or in biomedical publications. See also 'NEJM "failed its readers" by delay in publishing its concerns about VIGOR trial' in *BMJ* 2006;333:116.

1. Krumholz HM, Ross JS, Presler AH, Egilman DS. What have we learnt from Vioxx? *BMJ* 2007;334:120-3.

Do you know the feeling?

"Once or twice recently I have looked up a word in the dictionary for fear of being again accused of coining, and have found it there right enough–only to read on and find that the sole authority is myself in a half-forgotten novel".

Thomas Hardy

Worth reading

EMWA member Diana Taylor has spoken at industry conferences in the USA and Europe. Since 2003 she has led seminars and workshops on medical writing and communication across Europe. Her work from Sofia to San Francisco has been crystallised in *Healthywords* a recently published book that promotes the means towards a betterment in communications across the drugs industry. (*"The analysis and reflection is mature and reveals a lot of knowledge and good judgement. Impressive"*, sample feedback from City University, London).

Book details are readily available through the Internet search code: HEALTHYWORDS.

Who will pay?

Until now there has been a major problem with the idea of incorporating an intermediate tier of administrative help for preparation of funding applications, project reporting and project management. With most 'traditional' research funding being specifically earmarked to pay for salaries, consumables, or large infrastructure, there has been essentially no money available in academia to pay for such administrative services. At least one aspect of the problem is on the way to being resolved. A novelty in FP7, is the allocation of 7% of the total sums awarded for administrative costs of the successful applicants. However these funds will only be paid upon satisfactory completion of research contracts that often have a timeframe of several years. The issue of how to pay for writing services that can facilitate success in the first place is a problem that can only be resolved on a case-by-case basis. It is one that will require ingenuity, a pioneering spirit and the recognition that professional writing skills can only bring added value to sound projects of high scientific quality. There are hopeful signs that institutions wishing to seriously encourage their tenured staff to seek EU funding will be prepared to support some of these costs in future. The next problem encountered is likely to be where to find the highly skilled help that is required. Researchers in Switzerland, an associate member of the FP7 programme, have only recently acquired the right to act as coordinators for EU funded grants, and there still seems to be a dearth of interest from people with the scientific background and the writing skills to fit the bill. In fact throughout Europe there are very few schemes specifically designed to feed this branch of the training pipeline.

Are the EU policies an imaginative, holistic solution to fostering the progress of research and increasing its value to the community at large or is there nothing more behind them than a slick and expensive propaganda exercise? If, as scientist-writers we want to make it work, it's up to us to tailor solutions to the organisational problems that stand in the way of success. We need to learn the value of a whole range of communication skills and use them to promote the pursuit of knowledge without it resulting in a dumbing down at the cutting edge of science.

Moira Cockell
ALWRITE Scientific Writing and Editing Services, Savigny, Switzerland and Institute of Microbiology, CHUV hospital, Lausanne, Switzerland
info@alwrite.ch

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4. http://cordis.europa.eu/
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7. http://cordis.europa.eu/news/focus/home_en.htmlEuropean research Council Work Programme 2007 (draft version published by the Scientific Council of the ERC on 28 10 06) http://erc.europa.eu

English FAQs:

Is it wrong to write: 'The hydrochlorothiazide patients (or group) had a mean BP of …', or do I have to say: 'The hydrochlorothiazide-treated patients had…', 'The patients in the hydrochlorothiazide group had …', or 'The patients treated with hydrochlorothiazide had …'?

Using a drug name (or therapeutic method) adjectivally to describe a patient group is not wrong. On the contrary, it is an expedient way of describing one of the groups in a clinical trial. Adding the suffix '-treated' after a drug name or placebo used adjectivally in this way is also not wrong, but it does not enhance understanding, lengthens the text unnecessarily, and insisting on it is pedantic. Being constantly faced with '-treated' when it is perfectly obvious that the patients were treated is also very wearing on the reader. In the mountains of documentation we produce, every opportunity to be concise (while always preserving comprehensibility) should be exploited. The other two solutions are, of course, also perfectly acceptable, but they are very much longer.

Alistair Reeves
a.reeves@ascribe.de

English FAQs:

Is 'in the pipeline' jargon?

When you are speaking, use 'We have the following products in the pipeline' as often as you want. When writing in our context, I always prefer: 'We have the following products under (or in) development'.

Alistair Reeves
a.reeves@ascribe.de

Sicut

Often authors are encouraged to use an English rather than a Latin word in scientific writing but sometimes there is no exact equivalent of the Latin word in English. The Latin word sicut, known better by its abbreviation sic., is such an example. Roughly it means 'thus, so, just as'. It is usually written in italics and printed in square brackets after quoted words to indicate that a mistake made in the quote was originally made by the writer or speaker being quoted.

langdon@baxter.com