



## The perfect grant and how to get it

To help scientists build a career, Panayiota Poirazi says funders must earmark cash, reduce emphasis on collaboration and improve the application process.

According to an Editorial in *Nature* last year: “Young scientists face a harsher, more competitive, stricter, more dispiriting workplace than their bosses and senior colleagues did at the same stages of their own careers” (*Nature* 538, 427; 2016).

I am a ‘young’ (mid-career) scientist and although I don’t feel dispirited, I recognize many of the difficulties outlined in the Editorial. So, I expect, will my colleagues across the world: they experience a toxic combination of increased pressure and expectation mixed with dwindling financial support.

Those of us in Europe have an opportunity to seek change. The European Union is consulting on possible revisions to its current research and innovation programme, Horizon 2020 — the largest single source of scientific grants in the world. Young scientists should make their voices heard and ask for more.

What do we want? To find out, the FENS-Kavli Network of Excellence, an academy of young European neuroscientists I chair, asked more than 300 Europe-based researchers for input. Some of us discussed ways to improve the situation at a workshop organized by the European Research Council (ERC) last month. So, what would it take to create the perfect grant for young scientists?

The first factor is more funds ring-fenced to support individual young and mid-career scientists. There are few opportunities for single-investigator grants in Europe — these are essentially limited to the ERC funding schemes, the budget for which is just 17% of Horizon 2020. With success rates for most European grants very low, this makes it extremely challenging to support an independent research team, especially for early-career scientists. This is not the case in the United States, for example, where the National Institutes of Health devotes more than 30% of its budget for R01 single-investigator grants to support early-career researchers.

However good we are, young researchers in Europe simply cannot compete: short track records, limited experience at coordinating large grants and generally small networks of collaborators bias most — typically multi-investigator — funding schemes towards senior, well-connected principal investigators.

Although popular with many funders, collaborative, multi-investigator funding schemes come with their own difficulties. They often require high levels of management and coordination. Plus, true collaborations cannot always be forced from numerous principal investigators with different priorities. More importantly, owing to their large budgets, there are very few such grants and their success rates often drop below 10%, essentially pushing young scientists out of competition.

The perfect grant to build a successful lab, according to the participants in our survey, would last for about five years, have a budget of about €2 million (US\$2.1 million) and support a small

number of collaborators — not more than five.

The second factor in a perfect grant relates to the application process. When we asked young scientists to identify their biggest obstacle to carrying out good science, they named the burden not of teaching, but of grant preparation. Young scientists spend a colossal amount of time on this — and they know that much of their effort is wasted.

The ERC grant scheme, for example, is by far the most popular among the young scientists we surveyed — much more popular than national schemes run by the UK Wellcome Trust or the DFG in Germany. But its an application process could be greatly improved. The scheme is billed as two-stage, but for applicants, it has only one. They must simultaneously submit both short (B1, 10 pages) and extended (B2, 15 pages) descriptions of their research plans. After evaluation of the B1 section, about

one-third of all applications pass to a full evaluation, which assesses the B2 part. As a result, a significant number of researchers feel that they waste time and effort on something that has at least a 50% chance of not being evaluated. Our analysis suggests that each year, around 62 researcher years are spent on preparing ERC B2 applications that are not evaluated or reused.

(My view is that this time is not entirely futile, because it ensures a deeper understanding of the project, thus increasing chances of success. And many single-stage grant applications are much longer than 15 pages, and offer smaller returns.)

Young scientists are also often dissatisfied with how grant applications are reviewed. This stems from a perception that lengthy and time-consuming applications are not assessed properly. Respondents to our survey said they expected

the worst of their reviewers to have spent less than 20% of the time necessary to fully grasp their application, and even the ‘best’ reviewer was thought to have spent no more than 75% of the necessary time.

Young scientists feel that too much of the selection process is down to chance. To address this, funders should reach out to more specialists, collect and use applicant feedback to select the best reviewers and reimburse more of the good ones. Over time, this will purge undermotivated reviewers from the system.

These improvements to the Horizon 2020 programme should be relatively easy to implement. Importantly, they would significantly improve the funding process and bring overdue relief to European early- and mid-career principal investigators, supporting this key pillar of European science and innovation. ■

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