

Research Funding: The View From NIH

For many scientists seeking funding from NIH, this seems like the best of times and the worst of times. The opportunities to make scientific discoveries have never been better. Following the completion of the Human Genome Project and the International Hap-Map Project, we have guides to the common variations in the human genome. These maps yield an unprecedented opportunity to identify the genomic vulnerability to complex diseases and phenotypes, including mental illness, addiction, and alcohol dependence. New neuroimaging tools allow us to detect the circuits involved in the pathophysiology of brain disorders, revealing, for the first time, details of normal and abnormal functioning and development of the human brain. We now have national networks for clinical trials, facilitating large-scale studies of important public health questions. As directors of three NIH Institutes, we believe passionately that there has not been a better time for progress in clinical neuroscience.

But in this time of unprecedented opportunities, we are also keenly aware of the anxiety in our fields. From young investigators who are wondering if there is a future for a scientific career to seasoned scientists who are concerned about paylines, we are hearing that these are the worst of times. A sampling of recent questions would include the following: How can NIH have

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so little money to pay new grants when its budget was just doubled? How can you cut training when there are too few investigators in the field? What should I tell my graduate student who is thinking of leaving science? Are you funding any new grants? We understand that there is both confusion and anxiety about the state of NIH funding. This brief editorial is one attempt to dispel the confusion and allay the anxiety. Similar articles are available elsewhere and may answer questions that we do not address here (1, 2).

What is the state of NIH funding? Funding for NIH derives entirely from Congress, based on an annual appropriation process that commits a budget to each Institute. As part of the Department of Human Health and Services (DHHS), NIH is part of the executive branch of government and, as such, we may testify to defend funding for our Institutes, but we are legally prohibited from lobbying Congress for appropriations. From 1998–2003, there was an overall doubling of the NIH appropriation. However, since 2003, there has been relatively little change. The NIH appropriation for 2006 (the fiscal year that ended September 30, 2006) for our three Institutes averaged close to 0.4% above the previous year. The NIH appropriation for the current year has not been determined, but is expected to drop below the 2006 level.

If the budget is reduced, doesn't this mean we will fund fewer new grants? Not necessarily. Roughly 70% of our grant support in any given year is for “continuations,” the out-years of multi-year grants. The remaining 30% is a combination of new funds from our appropriation and uncommitted funds from the churn of multi-year grants that are completing their funding cycle. Thus, to project the funds available for new grants in 2007, one needs to look at the appropriation and at what was funded in 2002 and subsequent years. While some of these completed grants will return for competitive renewals, not all will compete successfully. Our most optimistic projections for 2007, assuming a nearly flat Congressional appropriation, suggest that we will be funding roughly the same number of grants as in 2006, due to the turnover from our current portfolio. Of course, any significant reduction in our budget will mean we have less money than we had in 2006 to fund new and continuing grants.

However, 2006 was not a growth year. The NIH success rate (the chance that a grant will be funded either in its original or amended form) dropped from 31% in 1998 to 19% in 2006. How can the success rate be dropping when the budget was just doubled? The success rate is the ratio of the number of grants funded divided by the number of applications submitted. This ratio is related but not identical to the payline, which is the percentile for funding in any given round of competition (<http://www.nih.gov/about/researchresultsforthepublic/successrates.pdf>). Clearly, if the number of grants funded stays the same but the number of applications increases, the success rate will fall. At NIH, the number of grants funded has increased. Indeed, our three Institutes collectively supported 4,393 research project grants in 2005, a 44% increase over the number in 1998. Just focusing on new competing grants, the number has increased to 1,148 in 2005, a 25.5% increase over the number of new grants funded in 1998. During this same period, the average cost of each awarded grant at our three Institutes increased by 34% to an average cost of \$368,100 in 2005. However, at the same time that we were funding more grants, there was roughly a 60% increase in the number of grant applications. The result is an imbalance of demand and supply, especially in the past 3 years when the increase in applications and applicants has accelerated. While every Institute and Center is facing slightly different constraints, the fundamental challenge is shared across NIH: just as the demand took off in 2003, the budget hit a plateau.

We believe this imbalance between supply and demand is a major source of the current angst in the research community. Even though in the post-doubling era we have been funding more grants than at any time in our history, the drop in paylines leaves many scientists feeling like we are in a fiscal famine. The reality is that competition is greater, funding requires more submissions with delays in research and sometimes loss of personnel, and many of the grants funded are being cut which, in turn, leads to more submissions. Moreover, with continued annual biomedical inflation at 3.5% or greater, following 3 or more years of sub-inflationary budgets, our purchasing power is falling substantially. It is this perfect storm of increased demand with reduced supply that has turned this scientific “best of times” into the “worst of times” for individual investigators.

NIH and each of the Institutes have addressed these tough times proactively. We have been especially concerned that the “worst of times” scenario could result in a loss of young investigators and a tendency to avoid high-risk research at the very time when new scientists and innovation can have the greatest impact. The NIH Roadmap and the Neuroscience Blueprint represent joint efforts to support enabling tools and resources for the community, allowing smaller labs and innovative ideas to be competitive. The Roadmap and Blueprint have introduced several new training opportunities to permit training in specific areas of need. In addition, NIH launched a new training mechanism, the Pathway to Independence Award (K99 R00), to facilitate more rapid transition from mentored training to independence. Each Institute has identified priorities for funding, ensuring that certain critical areas will be supported notwithstanding dropping paylines. For prospective and current grantees, there has never been a more important time to work with program officers who can advise about specific priorities and opportunities for funding.

As NIH Institute directors, we feel the urgency of delivering breakthroughs for human health, and we are passionate about the unprecedented opportunities to make those breakthroughs with new tools for discovery. We have witnessed previous funding cycles of feast followed by famine. This one is somewhat more dramatic because it follows such a profound increase in the NIH budget and because the research capacity has grown so quickly. But this period of angst will end just as previous difficult periods have ended, biomedical science will continue, and the supply and demand for funding will realign. Our short-term strategies to deliver scientific breakthroughs during this fiscal famine include reducing the size of awards and sharpening our priorities. These short-term strategies may help us through 2007, but these strategies are clearly not sustain-

able. With each additional year that the nation's support of science falls behind inflation, we are losing ground in our support of discoveries that will reduce the burden of mental illness, addiction, and alcohol dependence.

References

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