nature genetics

America competes—for now

The US government needs to show a commitment to keeping the nation competitive in science and technology.

"We fear the abruptness with which a lead in science and technology can be lost—and the difficulty of recovering a lead once lost, if indeed it can be regained at all."
—National Academy of Sciences Report, *Rising Above the Gathering Storm*

US congressional appropriations for the fiscal year 2008 finally seem likely to increase federal investment in basic and applied research after three consecutive years of cuts. We encourage legislators not to neglect the importance of momentum in biomedical research, as evinced by recent progress in human genetics, and to increase the National Institutes of Health (NIH) budget at least in line with research cost inflation.

Following the National Academy of Sciences study on the US's national competitiveness in science and technology, released in October 2005 (http://www7.nationalacademies.org/gatheringstorm/) and from which the above quote is taken, and on the heels of the US president's announcement of an American Competitiveness Initiative (ACI) in January 2006 (http://www.ostp.gov/html/ACIBooklet.pdf), measures to strengthen scientific education and research have been enacted into law with the signing of the America COMPETES Act on 9 August 2007. This legislation authorizes a set of incentives to produce a large number of highly qualified mathematics and science teachers and a scheme for teachers to provide advanced placement and international baccalaureate curricula, particularly in schools with a high proportion of low-income students.

The law also authorizes a doubling of funding for basic research in the physical sciences and engineering over 10 years at the National Science Foundation, the Department of Energy Office of Science and the Department of Commerce's National Institute of Standards and Technology. The congressional process of appropriating the funds to pay for these increases and the rest of the federally funded research resumes this month, and in an ideal world, it would be completed before the 2008 fiscal year begins on 1 October.

We wholeheartedly support federal investment in mathematics and science education and the proposed increases in funding for physical science and engineering. These are essential decisions for the future of US genetics research and for all the increasingly quantitative and cross-disciplinary research of the future. Molecular biology has benefited countless times from the physical sciences: notably from the intellectual input of research physicists attracted to the problems laid out in Erwin Schrödinger's book *What is Life?* and from the electronic engineering achievements that produced computers and the internet. However, it is important to sustain support for all areas of basic scientific research that provides the US society with flexible technological innovation.

Scientific innovation requires the availability of responsive-mode project grants for newly independent young researchers, as eloquently expressed by Robert Weinberg (*Cell* **126**, 9–10; 2006). There is indeed a lot of money for responsive-mode research—$10.1 billion allocated to R01 project grants from a total 2006 NIH budget of $28.8 billion—but new original R01-type grants in 2006 comprised $427.7 million, just 1.5% of the total budget and 4.2% of R01 funds (this point was made by Mandel and Vesell for the 2005 budget (*Science* **313**, 1387; 2006)). Amended grants can eventually be funded, too, but new investigators are particularly vulnerable to loss of career momentum. The average 'young' investigator is now getting that crucial first research project grant in the second half of his or her life, some 4 years after a faculty appointment. According to the NIH Office of Extramural Research (http://grants.nih.gov/grants/award/success.htm), the average age of the first award to a Ph.D. went up 5%, from 40 to 42, over a period in which the NIH allocation doubled (1998–2003). The number of first-time R01, R23 and R29 awardees did increase in the same period, from 1,633 to 1,787 (9%), with first-time investigators gaining 6% of the available grants.

According to the American Association for the Advancement of Science's 6 August update on US congressional R&D funding measures (http://www.aaas.org/spp/rd/upd807.htm), the US House of Representatives' 2008 appropriations of $58.6 billion for basic and applied research represent a 3% increase in federal spending compared with 2007, which would be a small increase over the expected 2.4% rate of inflation. The Senate's proposal of 3.9% ($59.1 billion total) would put spending ahead of predicted biomedical research inflation (3.7% in 2008). We urge lawmakers to rapidly provide a veto-proof, unified set of appropriations to ensure an overall increase in Federal research funding in 2008. For good or ill, this year will be remembered as the tipping point for US competitiveness in science and technology. ■