Congress gives science a record funding boost
Lawmakers largely reject deep cuts proposed by President Donald Trump for 2018

By Jeffrey Mervis

Researchers are ecstatic over the $4.8 billion increase that the U.S. Congress showered on nine leading civilian science agencies last week. But their joy may be short-lived.

The hikes, including $3 billion more for the National Institutes of Health (NIH), are part of a $1.3 trillion spending package for 2018 that includes a record $176.8 billion for federal spending on R&D—a 12.8%, or $20.1 billion, increase over 2017. The spending bill, which President Donald Trump signed last Friday, has put the scientific community “over the moon,” Rush Holt, CEO of AAAS (publisher of Science) in Washington, D.C., said in a statement. “We applaud congressional leaders ... for recognizing that funding science and technology continues to be a sound investment.”

The good news stems largely from a government-wide budget deal that allowed lawmakers to lift mandatory spending caps on discretionary accounts by a cumulative $300 billion over 2 years. But there’s a string attached: Most of the additional civilian spending occurs in the first year, 2018, meaning that researchers shouldn’t expect a repeat of this year’s windfall in fiscal 2019, which starts on 1 October 2018.

Another concern is the lopsided allocation, with NIH getting about two-thirds of the raise given to the top civilian science agencies (see graphic, p. 1448). That could reignite a long-simmering debate over whether federal investments have tipped too far toward the biomedical sciences.

Still, passage of the legislation marked a happy ending to a year of fiscal angst and political wrangling. Many scientists had seen Trump’s 2018 budget request as a slap in the face. Released last May, it called for massive cuts to research—22% less for NIH, an 11% reduction at the National Science Foundation (NSF), 17% less for the Office of Science at the Department of Energy (DOE), and a 24% cut at the National Institute of Standards and Technology (NIST). The White House also wanted to ax the Advanced Research Projects Agency-Energy (ARPA-E) and numerous climate and environmental science programs. A modest 1% dip in NASA science was a rare exception to the proposed bloodletting.

Congressional appropriators largely ignored the cuts Trump requested as they began writing their spending bills. Still, they were constrained by annual spending caps set by a 2011 law aimed at reducing the federal deficit over the next decade. In practice, the caps meant that any boost for one program required offsetting cuts elsewhere.

Those trade-offs reflected ideological and personal preferences. At NASA, for instance, Representative John Culberson (R-TX), a science fan who leads the House of Representatives spending committee that oversees NASA, NSF, and other science agencies, proposed cutting the space agency’s climate research—which he thinks falls outside NASA’s charter. At the same time, he wanted to expedite a proposed mission to Jupiter’s wa-}

U.S. SCIENCE FUNDING
champing at the bit,” says Thom Mason, a former ORNL director who is vice president for laboratory operations at Battelle in Columbus, which runs six DOE labs.

NIH, the biggest winner, cashed in on its traditional popularity among legislators and the potent pleas of disease advocacy organizations. No one expected Congress to go along with Trump’s proposed deep cut. Instead, the question was how much more NIH, which received $2 billion increases in both 2016 and 2017, would get this time around.

Last summer, before the budget caps were lifted, the House came in at the low end, with a $1 billion raise for 2018. The Senate countered with $2 billion. In the end, the two bodies “compromised” at $3 billion, an 8.7% boost. That’s the largest annual increase for NIH since a massive 2009 economic recovery bill gave it $10 billion.

The National Institutes of Health leads the way

<p>| Biomedical research won about two-thirds of the $4.8 billion increase given to nine civilian science agencies. |</p>
<table>
<thead>
<tr>
<th>New funding ($million)</th>
<th>2018 Budget ($billion)</th>
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<tr>
<td>National Institutes of Health</td>
<td>373</td>
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<tr>
<td>Department of Energy science</td>
<td>63</td>
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<tr>
<td>NASA science</td>
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<tr>
<td>National Science Foundation</td>
<td>295</td>
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<tr>
<td>U.S. Geological Survey</td>
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<tr>
<td>National Oceanic and Atmospheric Administration research</td>
<td>1.1</td>
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<tr>
<td>National Institute of Standards and Technology research</td>
<td>1.2</td>
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<tr>
<td>Department of Agriculture research</td>
<td>0.7</td>
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<tr>
<td>Environmental Protection Agency science</td>
<td>0.7</td>
</tr>
<tr>
<td>Total New Funding</td>
<td>1565</td>
</tr>
<tr>
<td>2018 Budget</td>
<td>5000</td>
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The total includes a 30%, $414 million increase for Alzheimer’s disease research. The Brain Research through Advancing Innovative Neurotechnologies Initiative gets a $140 million boost, to $400 million. The All of Us precision medicine study receives a $60 million increase, to $290 million. At least $500 million in new funds will go to research on opioid addiction. The bill also orders NIH to delay implementing a new, broader definition of clinical trials that basic behavioral and brain researchers had warned could stifle their research.

Even NIH advocates were stunned by the outcome. “Beyond words, folks,” tweeted Benjamin Corb, director of public affairs at the American Society for Biochemistry and Molecular Biology in Rockville, Maryland.

But outside the biomedical community the news stirred some quiet grumbling. NIH’s success recalls the large spending increases would have been better for NIH.

Congress may not have the fiscal wherewithal for another big boost in civilian research in 2019, however. There’s also reason to question its overall commitment to continued growth. In touting the omnibus bill, for instance, many top appropriators didn’t even mention research. Those that did mentioned just medical research.

The White House has also ignored the research boost, emphasizing the big increases for the military and denigrating civilian science programs. Trump responded to the news of a final deal by tweeting that he “had to waste money on Dem giveaways” to get the $700 billion he wanted for national security. Of course, those “giveaways” include every dollar spent on civilian science. ■

With reporting by Jeffrey Brainard, Adrian Cho, Jocelyn Kaiser, and Kelly Servick.

REGENERATIVE MEDICINE

U.K. trials of airway transplants are in limbo

Studies are based on flawed evidence and could harm patients, scientists say

By Matt Warren, in Liverpool, U.K.

Replacing a failing windpipe, or trachea, with one partially made from a patient’s own stem cells once looked like the cutting edge of regenerative medicine. But the concept took a severe blow in 2016 with the dramatic fall of Paolo Macchiarini, a surgeon at the Karolinska Institute (KI) in Stockholm. Macchiarini was fired by KI for scientific negligence and has been found guilty of misconduct in more than half a dozen papers. Most of his patients have died, and Swedish prosecutors are considering whether to reopen a criminal case against him that was closed last October.

But is the idea underlying Macchiarini’s work—“seeding” a scaffold with a patient’s own stem cells, in hopes of regenerating a healthy, functional organ—still worth testing in patients? That’s the question facing scientists in the United Kingdom, where two trials of stem cell–based larynx (voice box) and trachea transplants are planned but on hold in the wake of the scandal.

Both studies, led by former Macchiarini collaborator and University College London (UCL) laryngologist Martin Birchall, received approval from the Medicine and Healthcare Products Regulatory Agency more than 2 years ago and have obtained close to £5 million from U.K. funding agencies. An independent inquiry last year concluded there was no reason to cancel the trials, and UCL says they can proceed.

But some scientists say the studies, like Macchiarini’s operations, are based on flimsy evidence and could harm patients. In November 2017, cellular and molecular biologist Patricia Murray and biochemist Raphaël Levy of the University of Liverpool filed a detailed complaint with the U.K. Parliament’s Science and Technology Committee, which is holding an inquiry into research integrity, in an effort to stop the studies. (They followed...
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