BUDGET '97

NIH Up, for Now; Fusion Down

Congress cut the budget for fusion research by $11 million last week, but the program's advocates are not complaining too loudly. "We are grateful—it could have been much worse," says Anne Davies, who heads the Department of Energy (DOE) effort. On the same day fusion took a hit, a Senate panel approved a 4.1% boost for the National Institutes of Health (NIH). But NIH's supporters are not making much noise, either. That is because disagreements over education spending could leave the legislation in limbo and wipe out any increase for NIH.

These muted reactions came as lawmakers scrambled to complete as many spending bills as possible by 27 September so they can return home to campaign for re-election. The money for fusion was part of the DOE budget passed by both the House and Senate. This week legislators were expected to hammer out a common bill for funding NASA, the Environmental Protection Agency, and the National Science Foundation. But some agencies may wind up having their current budgets extended if Congress and the White House cannot reconcile differences before the current fiscal year ends on 30 September.

Fusion was among the hardest hit science programs in 1996, when Congress cut its budget by one-third, to $244 million. This year its budget was chopped again, to $233 million—below the $250 million minimum amount recommended by an advisory panel this spring (*Science*, 22 March, p. 1660) and the $256 million Administration request. The figure is a compromise between a House-passed level of $225 million and the $240 million approved by the Senate. Congress rejected a DOE request to count $16 million in program direction and computer work separately, however, meaning the core fusion budget is actually about $216 million.

Davies was relieved that the House level did not prevail as she feared. But she says "it will be a challenge to hold the program and the community together" at that figure. An advisory team will meet next week to devise a strategy.

As expected, the 1997 budget marks the last year of funding for Princeton's Tokamak Fusion Test Reactor. Deputy Director Rush Holt says he expects the final shutdown to occur next summer, although Davies said it could happen sooner. At the same time, lawmakers urged DOE to continue working with Europe and Japan on the International Thermonuclear Experimental Reactor project, an effort to demonstrate the viability of fusion energy. About $55 million—slightly less than this year—will be allocated, Davies added.

Solar energy R&D also fared poorly in the 1997 DOE budget, dropping 9%, while nuclear energy fell almost 17%. Biological and environmental research, however, won a $10 million boost above its $379 million budget, and funding for hydrogen remained stable. In contrast, water projects and defense programs in the bill won far more support than DOE civilian R&D. "It's clear who has the political muscle," says one DOE manager.

In DOE's defense area, lawmakers boosted funding for nuclear stockpile stewardship by $8 million, bringing it to $1.66 billion. Most of that additional money was set aside for the core science program, which accounts for just over $1 billion and does not include the cost of new facilities. The proposed $1.1 billion National Ignition Facility, the centerpiece of U.S. efforts to test nuclear weapons through computer modeling, received the full $132 million request.

The 1997 appropriations for NIH, part of a separate bill moving through the Senate, would mean a $487 million increase over 1996. It falls between the Administration's request for a 3.6% increase and the 6.9% approved in July by the House. But the final level is still up in the air. The bill funding the Departments of Labor and Health and Human Services, of which NIH is part, is caught in election-season crossfire. The White House threatens to veto the entire bill, arguing that it provides $6 billion less than the president wants for education and social programs. The bill also violates a spending limit imposed by Senate Majority Leader Trent Lott (R–MS).

The worst outcome would freeze appropriations included in the bill at current levels until next year, appropriations staffers say. A freeze would send a chill through programs pegged for rapid growth, such as the human genome program. Francis Collins, director of the National Center for Human Genome Research, says that a flat budget would delay plans to expand genome sequencing and have "a significant impact" overall on the center, the fastest growing unit at NIH.

–Andrew Lawler and Eliot Marshall

EAST ASIA

13 Universities Seek Common Ground

TOKYO—Divided by centuries of national enmity but connected by a common desire to improve their scientific capabilities, 13 universities in East Asia have joined together to foster academic cooperation. Last week the presidents and senior officials of these elite institutions met in Japan to take the first steps down what representatives hope will be a long road of joint research activities, faculty exchanges, and a shared pool of students and postdocs. "Most Asian universities have been oriented toward cooperation with Western institutions," says Jungho Sonu, president of Seoul National University. "We need to know East Asian universities better."

D. NORMILE

Small steps. Hong Kong's Woo hatched plan 3 years ago.

The new organization, called the Association of East Asian Research Universities, includes schools in China, Hong Kong, Japan, Korea, and Taiwan.* Although many of the universities already have one-to-one exchange programs, says University of Tokyo President Hiroyuki Yoshikawa, a regionwide association "opens a new age of collaboration." The first chair of the association, Hong Kong University of Science and Technology President Chia-Wei Woo, says he began discussing the benefits of such an association 3 years ago. Last January he hosted a "summit" of presidents, who then agreed to form the organization.

Leo Esaki, president of the University of Tsukuba, says that the drive for greater cooperation reflects increased confidence in academic and research standards. "Many universities here are really on the level of first-rate [U.S.] state universities," he says. Mingzhi Xu, vice president of Fudan University, says that being "from the same region and having a common cultural background" should smooth cooperative efforts. And Yoon-Jae Yang, director of international affairs at Seoul National University, hopes that the group will make Asian research "more visible in the Occidental society."

While hopes are high, initial goals are modest. "What we want are small successes," says Woo. "These 13 universities are very much alike in terms of quality of research and research capabilities, and there is a cultural affinity, too." He says that Kyoto University

* From Japan: Osaka U., U. of Tokyo, U. of Tsukuba, and Tokyo Institute of Technology; from China: Fudan U., Peking U., Tsinghua U. (Beijing), and the U. of Science and Technology of China; from Korea: Korea Advanced Institute of Science and Technology, Pohang U. of Science and Technology, and Seoul National U.; from Taiwan: Tsing Hua U. (Hsinchu); from Hong Kong: Hong Kong U. of Science and Technology.

and National Taiwan University are almost certain to join and that one or two other universities may also be invited.

The initial areas of cooperation have been winnowed down to two fields: molecular biology and biotechnology, and computer science. Last week, a task force was formed for each field and charged with identifying specific topics for cooperation, to be followed by a workshop or conference bringing together relevant faculty members and students. The goal is for researchers to pick their collaborators and for graduate students and postdoctoral researchers to pursue opportunities at any university in the association. Woo says this focus on research, as opposed to class work, avoids the thorny issue of transferring credits. Class work would also require fairly high-level language skills in what would be, for most students, a second foreign language.

The association also hopes to offer less serious opportunities for collaboration. Next year Taiwan's Tsing Hua University plans to host a "Go" tournament to capitalize on the popularity of the traditional board game. Pohang University of Science and Technology would like to host some sort of summer camp for students, although the details have not yet been worked out.

In fact, most of the association's plans are still vague. "There's no doubt we're interested in greater collaboration," says Woo. "But just where it will lead can only be imagined." What is more impressive, say Woo and others, is that the talks are being held at all. "It's the first time the presidents of major universities in East Asia have gotten together," says Seoul's Sonu. "That alone is really quite important."

–Dennis Normile

MALARIA

Serious Setback for Patarroyo Vaccine

Researchers have long dreamed of making a vaccine that would thwart the *Plasmodium* parasite. Each year, infection with this mosquito-borne organism causes more than 300 million cases of malaria and kills more than 1 million people, mostly children. But the parasite has evaded many of the weapons researchers have deployed against it. And now it may have done so once again. Recent field trials of a once-promising synthetic peptide vaccine called SPf66, created by Colombian biochemist Manuel Patarroyo, have not been encouraging, and the latest results, published on 14 September in *The Lancet*, are downright bleak.

The results, from a U.S. Army–sponsored trial of SPf66 among more than 1200 children in Thailand from 1993 to 1995, show no evidence of efficacy whatsoever. During the 2-year, $1.5 million trial, said to be the most expensive and best designed to date, roughly equal numbers of children receiving the SPf66 vaccine (195) or a hepatitis B "comparator" vaccine (184) experienced a first case of malaria. The authors, led by W. Ripley Ballou of the Walter Reed Army Institute of Research, conclude that, taken with other weak results, these data indicate that the SPf66 vaccine "does not protect against clinical falciparum malaria." Moreover, they write that the Thai data are so disappointing that "further efficacy trials are not warranted."

MAJOR FIELD TRIALS OF SPf66

Author	Location	Published	Efficacy
Valero	Colombia	*Lancet* 1993	39%
Alonso	Tanzania	*Lancet* 1994	31%
D'Allessandro	The Gambia	*Lancet* 1995	8%
Valero	Colombia	*Vaccine* 1996	35%
Nosten	Thailand	*Lancet* 1996	0

But SPf66 has been down in the dumps before and has bounced back (*Science*, 20 January 1995, p. 320). It has captured popular attention in South America and is supported by the World Health Organization (WHO). As epidemiologist Carlos Campbell of the University of Arizona, Tucson, says, the curtain has not yet rung down on this, "the biggest ongoing melodrama in malaria research."

The parasite's complex life cycle and multiple forms make it extremely difficult to beat. Patarroyo's strategy—which targets the blood stage of the lethal *falciparum* strain—aims to stimulate the immune system with a mix of synthetic peptides based on extracts from malaria-immune subjects. This upstart vaccine made a big impression when Patarroyo published articles in the late 1980s showing that it had protected monkeys against malaria and immunized more than 30% of soldiers who had been treated in Colombia. SPf66 appeared to be beating the skeptics. It gained momentum when Patarroyo donated a license for SPf66 to WHO in 1995. WHO responded by backing field trials.

Since the early 1990s, a variety of groups have carried out five large double-blind, placebo-controlled field trials of SPf66 (see table). The first two, yielding the highest efficacy rates (over 30%), were run with the help of Patarroyo's team in Colombia, where people face a relatively low "attack rate" by infected mosquitoes. The third big trial, backed by the Swiss Tropical Institute of Basel, took place in Tanzania, where the attack rate is said to be among the highest in the world. This study of 586 children, led by Pedro Alonso of Spain's Biomedical Research Foundation in Barcelona, reported an efficacy of 31%, but with wide error margins. The fourth trial, led by Brian Greenwood and Umberto D'Alessandro of the London School of Hygiene and Tropical Medicine and supported by Britain's Medical Research Council, took place in The Gambia, where the mosquito attack rate is moderate. Here, the vaccine had little effect and was associated with delaying or preventing malaria in only 8% of those treated. The study in northern Thailand, an area where the attack rate is also high, found no protection.

Observers read this mixed record in different ways. Ballou, for example, thinks it "closes the door" on SPf66, because the vaccine no longer looks useful for immunization in high-attack areas like Africa and Southeast Asia. But others remain optimistic. Alonso, for example, says "There is pretty strong evidence that [SPf66] is worthwhile in Tanzania," and he suggests that genetic differences in the population, the local parasite, or even in the chemical composition of the vaccine might have produced varying results. He thinks it is "bizarre" to suggest that no further field trials be undertaken. Patarroyo also thinks that small chemical differences may have affected efficacy rates. Ballou dismisses this view, noting that studies showed that the versions of SPf66 used in Colombia and Thailand produced similar results in tests of immunogenicity.

As for WHO, "We are somewhat disappointed" about the Thailand results, says Howard Engers, director of WHO's malaria research steering committee. But he adds, "It's not all doom and gloom around here." WHO plans to continue the Tanzanian trial of SPf66 in high-risk children and will evaluate those results before deciding on future trials.

Looking beyond SPf66, Engers notes that the attention devoted to Patarroyo's vaccine has helped spur interest in malaria vaccine development, and there are now at least three candidate vaccines in the wings waiting to be tested: a DNA vaccine designed by U.S. Navy researchers, a new U.S. Army vaccine being developed in conjunction with SmithKline Beecham, and an Australian vaccine already in field trials in Papua New Guinea. Engers says: "We see a bright future for second-generation malaria vaccines." This latest disappointment has only intensified researchers' dreams.

–Eliot Marshall