NIH Role in Biotechnology Debated

Science adviser thinks NIH should go beyond its health mission when it comes to nonmedical biotechnology research

For some time now, James B. Wyngaarden, director of the National Institutes of Health (NIH), and presidential science adviser George A. Keyworth, II, have been discussing NIH's role in the development of the biotechnology industry in the Untied States. Wyngaarden, believing that the NIH should focus most of its energy on basic biomedical research, has resisted suggestions that the institutes support biotechnology in nonmedical areas such as agriculture or computer architecture. Keyworth takes the contrary view. As an advocate of government measures to increase the United States' competitive position in biotechnology, Keyworth thinks that NIH should show its support for the national effort by broadening its sense of mission. Debate on this issue is said to have strained relations between the two.

The debate moved to a public forum recently when Wyngaarden called the members of his NIH director's advisory committee together for a 2 day meeting on the proper role of the institutes in the arena of biotechnology policy. The unspoken hope was that Keyworth would be convinced by the evidence that NIH does best when left to its traditional mission. Keyworth was in China.

A look at the NIH budget reveals the extent of the institutes' biotechnology effort both in dollars and in areas of research. For instance, in fiscal year 1983, NIH support for basic research and training "directly related" to biotechnology came to $442 million or 11 percent of the total NIH budget, according to figures in a report NIH prepared for Congress. In FY 1983, support for the "underlying basic research," came to $994 million or 25 percent of the total budget. For FY 1985, projected estimates are $600 million for research and training directly related to biotechnology and $1.3 billion for the broader effort. Giving examples of areas in which these funds are spent, NIH's report includes the following: understanding cancer, genetics and transplantation biology, clinical immunology and allergic response, and disease prevention through vaccine production. NIH's identity as a medical research agency is evident and the kind of diversification Keyworth is asking for truly constitutes a change of course.

Bernadine Healy, deputy director of the White House Office of Science and Technology Policy (OSTP), presented Keyworth's position. Describing NIH's "disease mission" as "too narrow a focus," Healy said that the Administration's commitment to basic research "is as strong as ever," but that Keyworth is looking for a "broadening of NIH's awareness" of the needs of other fields that will benefit from the new biology. Among specific suggestions was one that NIH support training in biotechnology in all disciplines, including the agricultural and physical sciences. NIH's recent collaboration with the National Science Foundation (NSF) in support of a new bioengineering center at the Massachusetts Institute of Technology was something Healy cited as an example of what NIH ought to be doing. The NIH's unwillingness to expand the role of its recombinant DNA advisory committee into a government-wide body rather than one tied exclusively to the institutes was noted as an example of NIH's recalcitrance. There is, said Healy, a "broad cultural gap" between the way NIH sees itself and the way Keyworth thinks it should be. NIH, she said, could do with a little consciousness raising.

> To maintain leadership in biotechnology, we should "let the NIH be the NIH," Theodore Cooper says.

Other participants in the advisory meeting took different positions that fall into two categories. On the one hand were those who, like Wyngaarden, think that NIH should retain its focus on basic research. On the other were representatives of biotechnology companies who argued for NIH funding of work they would like have supported in "generic applied research," which includes bioprocessing technologies.

According to Nanette Newell of Calgene, Inc., in Davis, California, the U.S. position in the world market demands a substantial commitment to research that falls in between truly basic research and clearly applied work. Japan, she said, has been ranked second to the United States largely because the Japanese are good at fermentation technology. However, recent indications that one cannot get sufficiently pure proteins from fermentation have lead to a new interest in finding ways to use mammalian cell cultures as a growth medium. Identifying this as an example of generic applied research, she observed that learning how to grow mammalian cells in industrial quantities could be important competitively. According to Newell, the U.S. spends about 1 percent of its research budget in generic applied research; Japan spends closer to 50 percent.

Newell called for NIH funding of this kind of intermediate research, as did Robert A. Swanson of Genentech in South San Francisco. "Our lead is fragile," said Swanson, who pointed out that both the Japanese and Europeans are targeting funds in the area of biotechnology development, particularly since they can take advantage of the U.S. commitment to basic research through licensing agreements. In Japan, he said, which has signed some 32,000 licensing agreements with American companies, the largest share of the research dollar goes to work that includes bioprocessing and development. The question of who should fund this kind of intermediate research promises to loom large in the overall biotechnology debate. NIH does not now see a major role for itself in this. But Newell observed that it is a kind of research that is both expensive and risky, something which the big companies can afford but which may be out of reach for smaller biotechnology outfits unless there is federal support.

Company representatives called for NIH participation in the development of the biotech industry in other ways as well. Richard Nesbit of Beckman Instruments suggested that NIH should promote "intellectual support" for biotechnology companies. "It is not usual," he said, "for academics to espouse the philosophy that business should succeed." Mark Pearson of Dupont suggested that since industry allows its staff to consult with NIH, it would be useful if NIH scientists were permitted to consult with industry. (Pearson's comments prompted Wyngaarden to report that NIH is, in fact, about to change its policy on this score. New guidelines defining the circumstances under which NIH researchers can consult will be issued soon.)

Whereas these industry representa-

Supercomputer Restrictions Pose Problems for NSF, Universities

A remote possibility that Soviet or Eastern European citizens could gain access to U.S. supercomputers to run military programs has prompted a high-level review by an interagency committee. Although such concerns are dismissed as groundless by some observers, they have caused problems in the contractual arrangements between the National Science Foundation (NSF) and the four supercomputer centers the foundation is establishing on university campuses. Some federal officials want access to the computers to be strictly limited, but the universities are anxious about the threat this would pose to their academic freedom, and NSF has found itself caught in the middle.

The concern stems from the fact that the Soviet Union does not possess supercomputer technology and thus cannot perform some highly complex calculations that require huge amounts of machine time. Such applications include many in the national security area. For example, supercomputers are widely used by U.S. intelligence agencies for such tasks as signals processing and by weapons designers to perform a variety of calculations and simulations.

Recently, Defense and State Department officials have been arguing that Soviet bloc scientists visiting the United States might clandestinely run such programs on U.S. machines, and the matter has been taken up by an interagency committee chaired by William Schneider, under secretary of state for security assistance.

Schneider's office is concerned in particular about access to computers in the academic supercomputing centers being established by NSF at the University of Illinois, Cornell University, Princeton University, and the University of California at San Diego. NSF was asked to put a clause in the contracts for the centers that would deny access to the machines by citizens from countries that are subject to international export control regulations—essentially the Soviet bloc countries and China. The clause would not have stopped them from participating in research projects but would have prevented them from actually logging on to the supercomputers to run programs.

The universities objected, however, because such a clause would infringe directly on their academic freedom. After negotiations that one participant describes as being "a mutual problem-solving effort between NSF, the security agencies, and the scientific community," the clause was dropped and replaced by language stating that the centers will adhere to whatever policy is finally adopted by Schneider's committee.

So far, the contracts have been signed by the John Von Neumann Center at Princeton and the San Diego center. Cornell and Illinois are still deciding what to do. They are reluctant to sign a contract that could tie them to a policy that has not even been developed yet. "We have a difference of opinion on how to preserve our academic freedom," says one university official. "It is against the policy of this university to discriminate on the basis of citizenship," he said. People on both sides say they are hopeful that an accommodation will be reached, however.

In the meantime, Schneider's committee is trying to develop a policy governing access to all supercomputers owned by the federal government or under government control. According to one participant, the problem has been greatly exaggerated. Those who have been raising concerns, he said, "don't understand that people can't just come in and bring a weapons code in their briefcase" and run it on a machine.

The kinds of uses that would pose a threat would be very sophisticated and chew up large amounts of machine time. Such uses could be guarded against by a variety of measures including program sampling, watching for very long runs, and so on, this official believes.

At present, the committee is at an early stage of its deliberations and will be collecting information over the summer. A final policy is not expected until the fall. —**COLIN NORMAN**

tives prodded NIH to expand its role, without advocating that it go very far outside of the medical field, other speakers at the advisory committee meeting defended the value of the status quo. Theodore Cooper of Upjohn, a former director of the heart institute, was summoned as a heavy-hitter for the institutes. Said Cooper, "U.S. leadership in science was created by science itself," and not by government policy or any directed effort. Arguing that research development is best left to industry, Cooper said that the way to maintain a competitive edge in basic science is to "let the NIH be the NIH." He did, however, raise one troublesome issue that several other speakers noted also—namely U.S training of foreign scientists, particularly the Japanese who become competitors. It is noteworthy that the United States has no major program for sending American scientists either to Europe or Japan for biotechnology training, speakers observed.

Two other participants who urged NIH to maintain its focused mission were former NIH director Donald S. Fredrickson, now president of the Howard Hughes Medical Institute, and Stanford University president Donald Kennedy. "NIH cannot and should not radically change," said Fredrickson, who added that NIH "can't supply all of industry's needs." Kennedy took the position that NIH should continue to focus on biomedical research, in part because he believes that much of what the biotechnology industry requires competitively includes things that NIH could not supply even if it wanted to. Issues regarding industrial collaboration with universities, he said, are for universities to settle. Availability of venture capital and other investment funds are not within NIH's purview. Nor, he said, are regulatory issues related to industry's belief that U.S. laws place it at a competitive disadvantage. "Stay with what you're good at," he said.

If the advisory meeting was meant to resolve the issue of NIH's biotechnology role, it probably failed. Wyngaarden summarized Keyworth's view when he said, "Keyworth is asking us to expand our sense of boundary." But in large measure, Keyworth's position remained unpersuasive to those who think NIH should stay exclusively in the health business. Likewise, rebuttals to Keyworth's position lacked sufficient force to settle the matter. Cooper suggested that the heart of the debate is more a matter of communication and perception than of substance, which may well be the case.—**BARBARA J. CULLITON**