INTERNATIONAL COLLABORATION

Funding Inequality Threatens Novel Bioscience Program

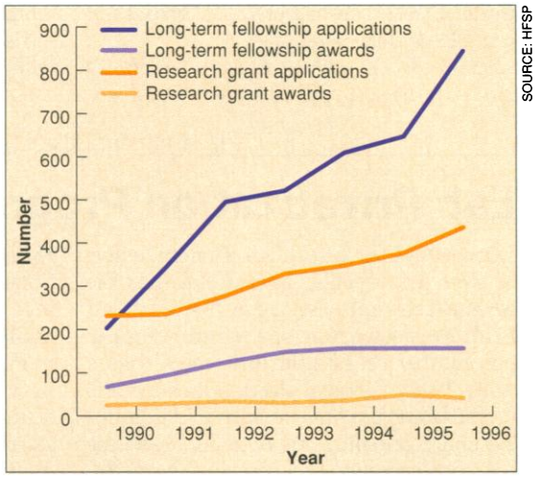
When the leaders of the world's major industrial powers issued a final communiqué from their annual summit meeting in Lyon, France, last summer, scientists were surprised and delighted that a small basic research program run jointly by member countries got a few words of praise. The world's most powerful people applauded the results of the Human Frontier Science Program (HFSP). And scientists familiar with the effort—a unique interdisciplinary program that fosters global collaborations in molecular biology and the brain—are equally enthusiastic: An external review of its scientific achievements gave it a glowing endorsement earlier this year. You might think that with such high-level support, this is one research effort whose future is assured in these parlous financial times. But in the next few months, the Human Frontiers program may be fighting for its survival.

The program was the brainchild of the Japanese government, which has funded it handsomely for several years. Japan has always hoped that the other partners in the project—Canada, Switzerland, the United States, and the members of the European Union—would follow suit, but while scientists in the West have embraced it, their governments have been parsimonious. This year, Japan still provided nearly 80% of the project's $46 million funds. This imbalance could be the project's undoing.

Next year, HFSP faces a major intergovernmental review, 10 years on from the summit at which it was first proposed, and the discrepancy over funding will be the main item on the agenda. "The funding imbalance can't drag on for much longer—it must soon come to a crunch," says Cesar Milstein of Britain's Laboratory of Molecular Biology in Cambridge, a former member of the program's council of scientists. "There are three possibilities for the future," says Pierre Chambon, director of the Institute of Genetics and Cellular and Molecular Biology in Strasbourg, France, chair of the council: "Keep at current level but trim topics to increase the funding rate; increase Western contributions to 50%, which makes most sense as they'd still gain because [Japanese scientists] would never achieve 50%; or close the program down."

A surprise hit. Focused on interdisciplinary research in the fields of molecular biology and the brain, HFSP funds young researchers to collaborate with leading scientists, regardless of where they are in the world. A key aim is to help people with new techniques and methods work with those who have new ways of exploiting them. "It's the only intercontinental program, and it brings together people who would only otherwise get together with difficulty," says Chambon. "The best people are applying." The number of grant applications nearly doubled between 1990 and 1996, while applications for its long-term fellowships have more than quadrupled.

The program fills an important niche: A recent study found that only 3% of applicants who failed to get a grant were able to find alternative funds. "The program represents a superb collaboration among nations to help support science without boundaries," says program trustee Wendy Baldwin of the U.S. National Institutes of Health in Bethesda, Maryland.



SOURCE: HFSP

Increasing popularity. HFSP gets so many applications that success rate is a problem.

When it was first proposed, however, the program attracted suspicion rather than enthusiasm from Western scientists. It was first unveiled at the 1987 summit in Venice, Italy, when Japan's prime minister announced Japan's willingness to support a program of international collaborative basic science, for which it would pay the lion's share of the bill. Many in the West assumed that this generous proposal was simply an effort to defuse tension between Japan and the United States on high-tech trade issues, and Western scientists were puzzled at exactly what Japan wanted. Some Western agencies even suspected that the program was an attempt to gather intelligence about leading-edge Western science through grant applications.

A lengthy series of meetings between Western scientists and Japanese officials to flesh out Japan's idea removed some of these suspicions. "It took 2 years to define the scientific content," recalls biochemist André Goffeau of Belgium's University of Louvain. Strasbourg was chosen to host a small secretariat that now runs the program.

The program was not an overnight success. It was such a novel idea that the rest of the world took 2 or 3 years to come to grips with what Japan was after. Former council member Akiyoshi Wada of Japan's Sagami Chemical Research Center describes the concept this way: Japan wanted to extend its "genius at combining apparently different disciplines to create new fields of study. ... The intention was to encourage researchers in fields other than biological science to participate," he says.

One of the program's early successes was an effort by 16 teams on three continents to develop standards that could turn hospital magnetic resonance imaging into a powerful research tool (*Science*, 1 November 1991, p. 716)—just the kind of interdisciplinary project HFSP wanted to support. This and other early projects gradually convinced Western countries that the HFSP was an effort on Japan's part to put something into areas of basic science it had largely ignored in the past, and also was a means of building contacts between its scientists and top-ranking researchers worldwide.

The program also attracted new members outside the seven leading industrial powers (the G7 group), such as Switzerland and non-G7 members of the European Union. But, although all the member countries pledged financial or in-kind support, their contributions have been tiny compared to the $37 million Japan is spending on the program this year. The United States, for example, upped its contribution from $3.5 million to only $4.0 million this year.

Budget imbalance. In recent years, Japan has begun to make it known that its generosity has limits. At the HFSP's last intergovernmental review in 1992 in Tokyo, participating countries acknowledged the imbalance and agreed to a target of 50% from Japan and 50% from other countries. But 4 years on, no progress has been made, and Japan is increasingly unhappy. "A clear goal was set to achieve a balance in contributions between Japan and the other member countries," says program trustee Pierre Vimont, director of cultural and scientific relations at France's foreign ministry. "We don't see many signs of movement. It's going to be a very difficult issue to deal with."

The crunch is likely to come next year at

HFSP's next intergovernmental conference. So concerned are the program's trustees that all countries have agreed to hold a preparatory meeting early next year to thrash out solutions to the funding problem and present an agreed agenda to the main conference.

Delegates to the meeting face a tough task. "There's a feeling among Japanese scientists that if there isn't a proper response from other countries, Japan may pull out," says former council member Milstein. This discontent stems in part from the fact that although Japan is putting up most of the funds, Japanese scientists receive only 15% of the grants. "There is little benefit to the Japanese overall," says physiologist Setsuro Ebashi of the National Institute of Physiology in Okazaki. "Most Japanese scientists, however, are of the opinion that the program is important in keeping contact with Western scientists," he adds.

Unfortunately for the Japanese government, it has decided to call in its credit just at a time when science budgets are being squeezed exceedingly hard in most countries. "When we're all in Strasbourg, we're highly enthusiastic about the program, but when we get home, we have to worry about national budgets," says trustee Francis Rolleston of the Canadian Medical Research Council.

One thing is clear: The position the United States takes at the meeting will be crucial. The United States receives more funds through the program than does any other country, yet contributes only 9% of the budget. "The U.S. government will play a key role in the future of the program," says HFSP's secretary-general, Michel Cuenod. The U.S. trustees on the program's board are supportive, but guarded: "The scientific review was very positive," says Mary Clutter of the National Science Foundation. "But funding is competing with everything else." A spokesperson for the Office of Science and Technology Policy in Washington says it is carrying out its own review of the program and that no decision will be made until it is completed.

Collaboration Across Continents

Molecular biologist Paul Schimmel of the Massachusetts Institute of Technology (MIT) wanted to study how proteins involved in the activation of amino acids for protein synthesis recognize the ribonucleic acids that carry the amino acids to the ribosomes. The problem was that his colleagues with the crucial expertise in cell biology, x-ray crystallography, and nuclear magnetic resonance spectroscopy were not just down the corridor, but in Strasbourg, France, and Tokyo. Schimmel was able to make the collaboration work with a research grant from the Strasbourg-based Human Frontier Science Program (HFSP), and the team has now published a sheaf of papers. "There's no question that the success of our collaboration was possible only because of the support of the HFSP," says Schimmel.

The HFSP provides money for items that national programs generally do not fund, such as salaries and travel expenses for the exchange of postdocs between collaborating laboratories and funds for regular meetings of international teams. "Agencies such as the NSF [U.S. National Science Foundation] and NIH [U.S. National Institutes of Health] have strict limitations on international travel and, in general, are not in the business of funding international collaborations," says Schimmel. "The HFSP has successfully identified a unique niche which they alone are filling."

Take the case of biophysicist Minoru Wakamori of the National Institute for Physiology in Okazaki, Japan. Wakamori, who works on the proteins controlling calcium channels in cell membranes, was keen to learn some molecular biology to modify the proteins he studied. He won an HFSP fellowship to work with molecular biologist Arnold Schwartz at the Cincinnati Medical Center. Says Schwartz, "I would consider this fellowship to be an ideal example of a two-way street. He brought with him sophisticated biophysics and instructed my students, and he learned some molecular biology." Wakamori agrees: "It's a good situation because I could also learn new techniques from scientists working in other fields."

Another MIT biologist, Nancy Hopkins, also found an HFSP grant key to her collaboration with Nobelist Christiane Nüsslein-Volhard at the Max Planck Institute for Developmental Biology in Tübingen, Germany. "The grant came at a fantastically important time. I'd had a sabbatical in Nüsslein-Volhard's lab, but there was otherwise little prospect we could build on the collaboration," she says. The grant has allowed them to speed up the creation of mutations disturbing the development of zebrafish and match the affected genes with those in other species (*Science*, 6 December, p. 1608). "Winning it was enormously important. ... I think international collaborations help you to get a world view of science."

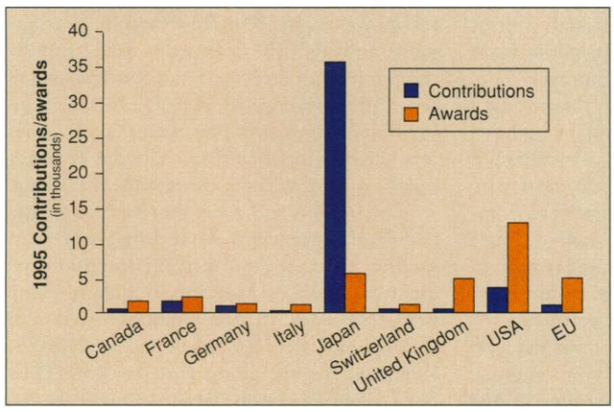
–N.W.

Perils of popularity. If the crucial question of funding can be resolved, researchers hope next year's meeting will also deal with some niggling problems with the program. One is the success rate for applicants. "Some people are discouraged by the funding rate, which is only 10% to 12% for the research grants," says Chambon. And for the first time this year, although it may be a statistical blip, the number of applications fell. Some researchers have called for more focused criteria to cut down on applications.

There have also been concerns about the program's elaborate management. It is run by a board of trustees and a separate council of scientists, each with two members from every participating country. "The amount of effort going into each decision is substantial—committees are doing a lot of work for small grants in absolute terms," says Milstein. But managers see the effort as essential to ensure impartiality, and a review of the program's administration earlier this year found it to be cost effective and efficient.

Despite these imperfections, "I'd be shocked, saddened, but very surprised if a program of this quality could not continue," says council member Albert Aguayo of the Center for Neuroscience Research at Montreal General Hospital. Canada's Rolleston agrees: "In spite of the domestic problems, Canada thinks it is an excellent program, and I'm sure we are not going to pull out." Survival of the program is still uncertain, however. "It's an important meeting ahead, and it's difficult to say whether it will be successful," says Vimont. Adds Milstein, "I am hopeful it will survive. Too many people by now realize that it ought to continue. If this program died away, another one like it would have to come along."

–Nigel Williams



SOURCE: HFSP

Budget imbalance. Other partners have failed to match Japan's commitment to HFSP, but they are getting most of the awards.