JAPAN

New Faculty Grants Program Expands Role of STA Agency

TOKYO—Neurobiologist Ichiro Kanazawa has long wanted to launch a major project to analyze the molecular processes that lead to cell death in individual neurons. The results, he believes, could shed light on a number of degenerative diseases, including the aging process itself. But Kanazawa, who heads the neurology department at the University of Tokyo's Faculty of Medicine, knew there was no way the Ministry of Education, Science, Sports, and Culture (Monbusho) would fund a project requiring a dozen or more people and hundreds of thousands of dollars for equipment and supplies. Monbusho typically doles out tiny grants to academic researchers, and government regulations prohibit researchers from using the money to hire personnel. "I didn't have [enough] funding and I didn't have a staff," he says.

Soon, however, Kanazawa will have both. He is one of 54 scientists who last month received grants from a new program, dubbed Core Research for Evolutional Science and Technology (CREST), launched by the Research Development Corporation of Japan (JRDC). The new program is the latest in a series of innovative approaches to supporting research that were developed by JRDC, which 15 years ago created the Exploratory Research for Advanced Technology (ERATO) program. In addition to being a boon to researchers, CREST solidifies JRDC's position as one of Japan's most powerful research funding agencies.

The idea behind CREST is to give scientists like Kanazawa a free hand to pursue a large, ambitious, and somewhat risky project with a huge potential payoff. The 5-year grants, in one of seven strategic areas (see table), are worth up to $10 million. And the projects announced last month are only the first wave. Over the next 4 years, Japan hopes the program will grow to 250 projects with an annual budget of half a billion dollars. "This is really a great thing for researchers," says Kanazawa, who plans to hire six postdocs and as many as 10 technicians and assistants for his project.

CREST stands in sharp contrast to the typical way that Japan funds academic science. That system is dominated by small, narrowly focused projects, awarded on the basis of seniority and with a preference for orthodoxy, linked to an institution rather than an individual, and watched over closely by the funding agency. Instead, CREST relies on an open, national competition—more than 1300 proposals were submitted in the first round—makes large awards, and cuts its winners loose from the usual bureaucratic interference.

In many respects, CREST is a more targeted program than ERATO, reflecting Japan's recent focus on "strategic" research to provide a technological base for the nation's economy. And the fact that this important task has been entrusted to JRDC is a tribute to ERATO, which was founded by a JRDC official trying to shake up the country's rigid approach to funding science.

The JRDC was established in 1961 to promote technology transfer from universities and national labs to the private sector. In the late 1970s Genya Chiba, a nuclear scientist who joined JRDC after studying and working in the United States, decided that Japan's current system would never allow it to catch up to its global scientific competitors. Looking for ways to break from that mold, he created a program in which project leaders were given ample funding and free rein to set up their own labs. That was possible in part because the JRDC, as a public corporation affiliated with the Science and Technology Agency (STA), is not subject to the government's restrictions on personnel. "We borrowed from the theatrical system," says Chiba, now vice president of JRDC, about ERATO. "We ask the project leader to run a 5-year performance."

CREST'S SEVEN STRATEGIC AREAS

- The functioning of the brain
- Genetic programming
- Immune mechanisms
- Quantum effects and other physical phenomena
- Single-molecule and atomic-level reactions
- Phenomena of extreme conditions
- Model systems to reduce environmental burdens

After 15 years, ERATO has achieved several notable successes. It has continued to grow—four new projects are selected each year—and program reviews so far have been smashing. "The quality of ERATO work has been very high," says John Rowell, a former Bell Labs materials scientist who served on evaluation panels on behalf of the U.S. National Science Foundation's Japanese Technology Evaluation Program in 1988 and again last year. (The new report will be posted this summer on the program's World Wide Web site at http://itri.loyola.edu/jtec_wtec.htm.)

One good example of ERATO's success, says Rowell, is the Tonomura Electron Wavefront project. The team, led by Hitachi Ltd. researcher Akira Tonomura, developed methods of imaging and measuring magnetic flux by electron holography. "It almost generated a field around itself," Rowell says. The work continues at Hitachi's Advanced Research Laboratory (*Science*, 8 March, p. 1393).

The road from ERATO to CREST passes through two other JRDC programs. Building on ERATO's success, the JRDC set up an International Joint Research Program in 1989. In 1991 it created PRESTO, a program that provides younger researchers with roughly $100,000 a year for 3 years for independent projects. Together they paved the way for other ministries, including Monbusho, to embrace another essential element of CREST—the use of peer review to channel funds not to institutions but to individuals and small groups. "ERATO was the first government-supported research program where the emphasis was on the leader and the research topic," says Yoshihisa Yamamoto, an electrical engineer who has moved from Nippon Telegraph & Telephone Corp. to Stanford University, where he runs an ERATO project.

D. NORMILE

On stage. Chiba helped to create CREST and ERATO.

The CREST initiative represents the largest ERATO clone to date. "The reason we got this chunk of money [for CREST] is that political circles have endorsed our series of programs," says Chiba. But there are some important differences, too. While ERATO project leaders are hand-picked by JRDC officials, CREST conducted a national competition. ERATO's research themes have been virtually unlimited, while the seven target areas for CREST projects are seen as building blocks to valuable products and technologies.

Perhaps the most fundamental difference is in the degree of cooperation between government agencies. ERATO project leaders are not allowed to use national university facilities and, for many years, national university professors heading ERATO projects had to insulate them from their university activities. CREST projects, in contrast, are considered part of a professor's overall research effort.

All parties agree that CREST should add an important ingredient to the lineup of funding schemes. And Japan officials hope that researchers will respond to world-class support with world-class efforts. "It's really big money," says Tokyo's Kanazawa. "And with a staff like this, I really have to work hard."

–Dennis Normile