of leading academic figures, encouraged universities to conduct internal reviews of their teaching and research programs. In response, virtually all of the country's 98 national universities have implemented some form of review.

Arima, who was a member of the advisory council, says the council viewed these self-evaluations as the prelude to more comprehensive—and preferably external—reviews. And Arima decided that his own institution—Japan's most prestigious university—should be leading the way. "If it had been done [first] at another institution, it would not have had the same effect," he says.

As an inducement, Arima made money available to bring in internationally recognized reviewers. And being a physicist, he urged the physics department to take the lead. Shun-ichi Kobayashi, dean of the faculty of science at the university, says physicists were encouraged to go ahead after being shown that they ranked favorably in a recent review of citation index data, an important criteria for Arima. ("He likes checking citation indexes because he has a lot of citations," Kobayashi remarks.)

Thus, in January 1993, a stellar cast including Sidney Brenner of the University of Cambridge and Nobel laureate Leo Esaki, president of the University of Tsukuba, gathered for 3 days to inspect facilities, hear about department policies and funding, visit each research group, and write a report. "It was probably the first such comprehensive review at any Japanese university or research institute," Arima says with pride.

**Measuring the impact.** Since then, announcements of scheduled external reviews have become a staple of academic life. Most reviews have followed a pattern in which the panel's overall observations and recommendations are made public, while comments on individuals and specific programs are kept confidential.

Many of the recommendations focus on issues—the need for better facilities and increased budgets—that require action by Monbusho. While in some cases this merely adds more voices to the large chorus demanding greater government support, it can pay rich dividends. Yusei Maruyama, a professor in the department of molecular assemblies at the Institute for Molecular Science in Okazaki, says that a recommendation to form a group focusing on theoretical studies of molecular assemblies appears to have helped convince the education ministry to fund two new faculty positions next year in that area—a rare concession from the ministry. Similarly, a glowing international review of the Center for the Study of the Earth's Interior, nominally part of Okayama University and located in Tottori Prefecture, helped persuade Monbusho to give that institute several new positions.

## PROFILE

# Chemist Goes Her Own Way

Mikiko Sodeoka hasn't had the advantages that often pave the way for scientific success in Japan. She did not go to a prestigious university, and she didn't even take a major in basic science. But that hasn't stopped Sodeoka, currently an assistant professor at the University of Tokyo, from developing into what Harvard University bio-organic chemist Gregory Verdine calls "a world-class synthetic organic chemist." Nor has it kept her from branching into molecular and cell biology, where she applies her skills in chemical synthesis to study how molecules interact with DNA and proteins. "Few labs anywhere have such breadth," enthuses Verdine. "She's the most interdisciplinary young scientist in Japan."

Sodeoka's journey into science has been a foray into uncharted territory rather than a traipse down a well-trod career path. Born in the coal town of Omuta on the southern island of Kyushu, Sodeoka says she gained "an appreciation of nature" from her father, who worked for the local chemical industry. Still, when Sodeoka entered Chiba University, near Tokyo, she majored in pharmaceutical rather than basic science. "I was interested in medicine and life science, but I thought it was so difficult to become an academic researcher," she explains. Like her fellow pharmacy majors, more than half of them women, she "also thought it was good to get a license" so she could get a job as a pharmacist.

ELJI MIYAZAWA/BLACK STAR

**Courageous chemist.** Mikiko Sodeoka of the University of Tokyo has confidence to take on new fields.

In her fourth year, however, Sodeoka joined a research group in organic chemistry and liked it so much she decided to stay for a graduate degree. She had the good fortune to work with assistant professor Masako Nakagawa (who recently became one of only three female full professors of chemistry on the pharmaceutical faculties of Japan's national universities). "She showed me that women can do good research," Sodeoka recalls. "I felt it would be difficult, but not impossible and worth a try."

After earning her master's degree, Sodeoka joined Sagami Chemical Research Institute, a semiacademic industry lab, where she worked for Masakatsu Shibasaki while finishing her doctoral research. When Shibasaki became a professor at the University of Hokkaido, he asked her to join his new lab.

Sodeoka earned her Ph.D. at Hokkaido and headed for the United States as a postdoc in the Harvard lab of chemistry Nobelist Elias J. Corey. "She impressed me as very intelligent, with a high ability to cut through complications and come up with good insights," Corey recalls. "And she was very, very gracious." She moved on to Verdine's lab, where she immersed herself in molecular biology, and within a year, Sodeoka had engineered a bacterium to overproduce an important transcription factor involved in regulating the immune response. The achievement allowed her to study the protein's interaction with DNA. Reveling in freewheeling, "big-picture" discussions with her labmates, she also demonstrated "impressive" skills as a beer drinker, Verdine recalls, "an ability that is much appreciated at Gordon conferences."

Today, at the age of 35, Sodeoka is back in Japan as an assistant professor in the lab of her old mentor Shibasaki, now a full professor at the University of Tokyo. While the lab focuses on catalytic asymmetric synthesis of organic compounds, he generously allows Sodeoka to spend part of her time on biology, synthesizing fragments of the enzyme protein kinase C in an effort to understand how the enzyme interacts with phorbol ester to trigger its activity.

Like most Japanese scientists her age, Sodeoka has yet to run her own lab, so "we don't know how she'll do with her own group," Shibasaki cautions. But Verdine says he has great faith in her ability. "It takes someone with a lot of courage" to do her brand of original, interdisciplinary work, he says. "She goes where the action is, even if it's out on a limb."

–J.K.