Goal-directed revamp for Japanese research

David Cyranoski, Tokyo

An ambitious effort to restructure the research arm of Japan's industry ministry has already attracted a clutch of prestigious scientists to head its new institutes. They include leading university researchers from the United States and Sumio Iijima, the discoverer of carbon nanotubes.

Hiroyuki Yoshikawa, a former president of Tokyo University, is in charge of the research revamp at the Ministry of Economy, Trade and Industry (METI), previously known as the Ministry of International Trade and Industry (MITI).

On 1 April, the National Institute of Advanced Industrial Science and Technology (AIST) will be set up as an autonomous agency within METI. It will replace the old Agency of Industrial Science and Technology (also known as AIST).

The new body will comprise 45 institutes and centres. Its structure is designed to combine application-orientated goals with considerable operational autonomy for the institutes.

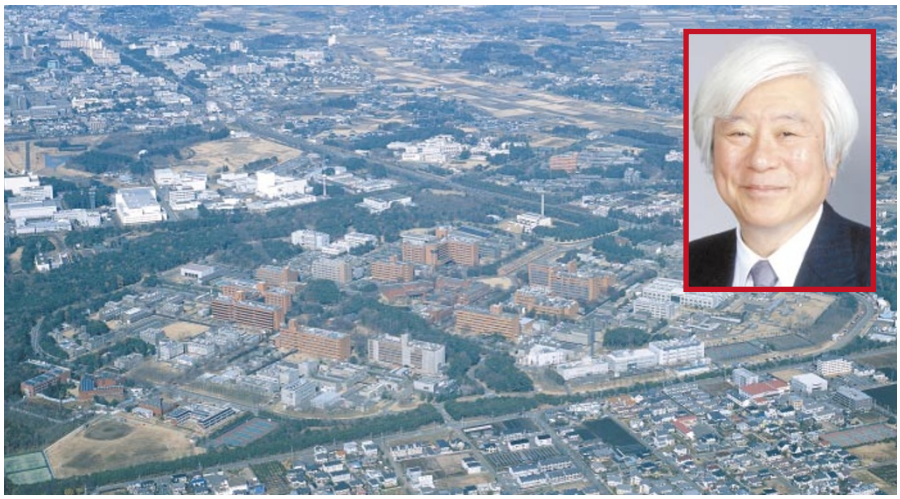
Yoshikawa will appoint institute directors and allocate funds, powers previously held by civil servants at METI. But Yoshikawa says he recognizes that autonomy brings with it the responsibility for delivering results. "A national institute has to prove its value to society — it has to be mission-oriented," he says. He adds that the old AIST allowed researchers too much freedom "to follow their own curiosity".

One key mission will be to gear research towards "sustainable development". The aim is not only for advances in environmental science, but also to achieve social goals, Yoshikawa says. Japan's rapidly ageing population, for example, might benefit from the applications of robotic technology.

The new institutes and centres will be formed by splitting up the old AIST's 15 laboratories. Each institute will house fewer than 100 researchers, whereas the old AIST laboratories employed as many as 600 research staff on a single site. The reduced size is meant to bring greater accountability, and the new system will be evaluated in three to five years' time.

Although researchers appreciated their freedom, under the old system, from having to consider practical applications for their research, some say they are ready for tighter organization. "To make a big impact, you need strong management and clearer authority," says Junji Itoh, a 16-year veteran of the old AIST and director-designate of the new Electronics Research Institute, which, like most of the institutes, is based in Tsukuba.

But some critics fear that too many institutes will lead to inefficiency. "Communication will be key," says Fu-Kuo Chang, a researcher in aeronautics from Stanford University in California, who will head the Smart Structures Research Center.



Fresh horizons: the AIST facilities at Tsukuba, which will be led by Hiroyuki Yoshikawa (inset).

The institutes are being designed to forge stronger ties between basic science and its industrial application. Previously there have been few such links in Japan. New measures to give researchers a direct share in any technology transfer agreements are designed to encourage such collaboration. The institutes will also accept commissioned research projects from commercial companies.

Iijima will head AIST's Research Center of Advanced Carbon Materials. And Kotoku Kurachi, a professor of human genetics, is returning to Japan after 30 years in the United States to head the Gene Discovery Research Center. He says the emphasis on practical applications "is a new thing in Japan, where academics have generally stuck to a 'pure science' ethic". Kurachi, who was most recently at the University of Michigan, says he plans to work on medical applications of his research on the genes involved in the increased risk of cardiovascular disease with age.

The transformation of AIST is being watched with special interest by Japan's universities, which are also due to become independent agencies in 2003 (see *Nature* **401,** 416; 1999). ■

Israel seeks sweet smell of success

Haim Watzman, Jerusalem

A project to create a DNA database of the genes responsible for the perfume in flowers is under way at the Hebrew University of Jerusalem. Its purpose is to identify genes that can be inserted into cultivated flowers in order to improve their smell.

The project has already identified some 2,000 genes that are active in rose petals and has created a library of expressed sequence tags (ESTs) that map the genes.

According to David Weiss, a horticulturist and a member of the project team, the work has identified seven candidate genes for initiators of the biochemical processes that produce rose aromas. The next step, he says, is to study the biochemical pathways that lead from the gene, through the proteins they produce, to the substances that give the flower its pleasant smell.

"We know a lot about the chemistry of flower perfumes, many of which are produced synthetically by industry," Weiss explains. "But we know very little about the biochemistry — the biological processes that produce the perfumes." The work is supported by a US$220,000 annual grant from the Ministry of Science.

Weiss and his colleague Alexander Vainstein recently broke new ground. They transferred an aroma-producing gene isolated by Eran Pichersky of the University of Michigan from a wild California flower, the clarkia (*Clarkia breweri*), into carnations. Carnations possessing the gene, Weiss says, have a new biochemical pathway that produces the major compound responsible for the clarkia's aroma, linalool, and other fragrance-producing chemicals.

Cultivated flowers, bred for their large, colourful blooms, tend to lose much of the smell of their wild ancestors, Weiss explains. Getting the smell back into them could be a major boon for Israel's 1,600 flower-growers, who export $250 million worth of flowers each year. ■