JAPAN ROUNDUP

Two new techniques for cancer therapy have been developed by researchers at Takeda Chemical Industries (Osaka) and Sapporo Breweries (Tokyo).

Takeda scientists, in collaboration with researchers at Harvard University (Cambridge, MA), have developed a monoclonal antibody that specifically inhibits the angiogenic activity of human basic fibroblast growth factor (bFGF). The antibody suppresses tissue vascularization: for tumors, this means reducing the supply of nutrients to malignant tissue. The anti-bFGF antibody—when administered to nude mice daily at a dose of 0.2 mg—was able to reduce the growth of transplanted tumor tissue by one-third compared with controls. Histological examination of the tumor confirmed that it lacked vascularization. Meanwhile, Sapporo researchers have completed pre-clinical tests on a polysaccharide extracted from rice bran (Rice-Bran Saccharide, RBS) as a cancer therapeutic. RBS is able to enhance immune activity, thus suppressing the growth of tumor cells. When given to mice with pulmonary carcinoma and skin cancer, RBS exhibited higher-than-normal anticancer activity. Sapporo has established a mass-production system for RBS and will soon start clinical trials.

Professor Toshiyuki Uriu of the University of Tokyo's Institute of Industrial Sciences and his colleagues at Yamaguchi University Medical School and Ajinomoto (Tokyo) have demonstrated that curdlan sulfate, a bacterial polysaccharide, has remarkably high anti-viral activity against HIV.

When applied to infected cells *in vitro*, curdlan sulfate completely blocked propagation of the virus—at a dose of 3.3 micrograms/ml (equivalent to 0.02 g for 60 kg body weight). Further, the compound was not cytotoxic, even at a dose of 5,000 micrograms/ml, suggesting the possibility of much wider applications compared to those of conventional AIDS therapeutics, such as dextran sulfate. The research group will apply for FDA approval for clinical trials this autumn, as well as try to improve curdlan sulfate's *in vivo* half-life.

Researchers at the National Food Re-

source Institute of the Ministry of Agriculture, Forestry, and Fisheries (MAFF) have discovered a novel lectin that specifically recognizes oligosaccharides containing sialic acid, commonly found on the surface of animal cells. The lectin is produced by a wide array of plants belonging to the genus *Sambucus*.

Institute scientists have also developed a new screening method to identify quantitatively specific lectins for given sugar chains. The researchers will use the new lectin and the screening method to establish isolation and analysis techniques, as well as to elucidate mechanisms of sugar-chain recognition.

Meanwhile, Professor Curtis R. Youngs (Iowa State University [Ames] Department of Agriculture) has been awarded a grant from MAFF for producing useful transgenic animals, such as pigs and sheep. Regulatory constraints make such experiments almost impossible to do in Japan. The grant amounts to a total of 45 million yen (about \$300,000) over a three-year period.

The research project includes development of efficient gene introduction techniques—such as particle-gun, sperm-vector, and tungsten-coated injection methods—as well as utilization of tissue-specific promoters to regulate gene expression. The aim is to produce animals with improved meat quality and/or disease resistance.

Together with the research project, an exchange program of U.S. and MAFF researchers will foster and promote their cooperative relationship.

Toyota Motor Corporation (Toyota), the largest automobile manufacturer in Japan, has initiated a fundamental research program in biotechnology. Toyota Central Research and Development Laboratories, the core research institute of the Toyota Motor Group, has expanded its Research Division 11 (Division of Environmental Science & Technology), which had focused on areas such as environmental chemistry.

The primary goal is not only to accumulate technologies such as recombinant DNA, but—considering the company's tendencies toward multi-lateral strategies—it seems likely that

Toyota may take the plunge into the biotechnology business.

MAFF recently announced that it will organize an incorporated association of biotechnology-related companies. The association, tentatively entitled the Society for Techno-Innovation of Agriculture, Forestry and Fisheries (STAFF), is expected to comprise 150 Japanese bio-companies. Thirty-seven companies have already been nominated to organize the association, solicit members, and prepare for its formal establishment this month. Emeritus Professor Itaru Watanabe (Keio University) has been nominated as the chief organizer.

In cooperation with the Ministry's research institutes, STAFF will promote the development and commercialization of biotechnology in the agriculture, forestry, fishery, and food industries. Further, the association is expected to play a role in promoting and authorizing field experiments of genetically engineered organisms. The Japan Bioindustry Association (JBA), which was established by the Ministry of International Trade and Industry, has been playing the leading role in organizing biotechnology-related companies; STAFF will be the second such organization in Japan.

As part of the grand plan of the Chiba Prefectural Government's "Kazusa New Research and Development City," the construction of "Kazusa DNA Research Institute" will start within a year. The work will be supported by a five-billion-yen fund from the Prefecture and regional governments, as well as by money from the private sector. The new Institute will be the core facility of the Science City, which will include various private research institutes in the fields of biotechnology, electronics, and new materials.

The Institute will open in 1993 with a 70-member staff, headed by Professor Mitsuru Takanami of Kyoto University. Its research programs will investigate DNA structures and functions, develop techniques to analyze DNA, and establish a DNA library and clone bank.

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