JAPAN ROUNDUP

Toyota Motor Corp. (Toyota) has budgeted 500 million yen for a new biotechnology research institute, to be headquartered at its technical center. In addition to the ongoing biotechnology research activities at Toyota Central Research and Development Laboratories, the new "Bio Lab" further strengthens the company's research potential in fundamental biotechnologies. The number of scientists is currently 11; this should expand to between 30 and 40 in the next 3–4 years.

Research at Bio Lab will be focused on protein engineering and plant biotechnology. Researchers will use protein engineering to develop new biomaterials such as decomposible plastic; in plant biotech, the focus will be on developing plants with greater abilities to fix CO_2. In 1991, research areas will expand to include biomonitoring and information processing.

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Scavenger receptors play a significant role in arteriosclerosis. That large numbers of these receptors exist in the inner walls of blood vessels has been demonstrated by the joint research group of the National Institute of Health and Nutrition, Tokyo University Medical School, Kumamoto University Medical School, and Chugai Pharmaceutical (Tokyo).

A large number of blood vessels incorporating degenerated low density lipoproteins (LDL) are found in arteriosclerosis; it is thought that scavenger receptors are involved in this process. The researchers have developed an antibody to the scavenger receptor; they used this to determine that the receptors were more dense in arteriosclerotic blood vessels than in other tissues. As well, they found that the receptor is absent from healthy blood vessels.

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Snow Brand Milk Products (Tokyo) researchers—in collaboration with groups at Toyobo (Osaka), Amano Pharmaceutical (Nagoya), and Iwai Kikai Kogyo (Tokyo)—have developed a new bioreactor that can degrade casein at an arbitrarily chosen rate. Being able to control the rate of degradation may lead to the ability to produce various smaller proteins with superior thermostability or solubility. The new bioreactor uses Amano's protease S fixed to chitosan beads. The system can be operated continuously for up to 90 days. Snow Brand Milk Products plans to test the system's efficiency for one year. It will use it to develop new biomedical materials and emulsifying agents.

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Frozen plant tissue can be made to grow again. This technology was developed by researchers at the National Institute of Agrobiological Resources (Ministry of Agriculture, Forestry, and Fisheries), in a collaboration with scientists at Iwate University.

They excised a five millimeter piece of apple tree tissue called winter bud—which is formed at the tree's base in cold weather—and froze it in liquid nitrogen to −40° C. When defrosted, 45–100 percent of the winter buds regenerated.

There are well over 1,000 varieties of apple; preserving the entire gene pool would require a vast number of orchards. The freezing technology will greatly reduce efforts for managing this gene pool. Further, raspberries and blueberries could be preserved using similar methods. The researchers are now working on improving regeneration rates and developing easier freezing methods.

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Mercian (Tokyo), a top-tier Japanese wine brewery, has entered the field of marine biotechnology. In the aquaculture of commercially important fish, a stable supply of zooplankton—including rotifers—is indispensible. And rotifers' primary food source is the alga Chlorella. Merciam has developed the technology to culture Chlorella in salt water.

To exploit the new technology, Mercian has established a new aquaculture business—Marine Bio—in collaboration with Amakusa Aquaculture, a leading bream culture company, and Tokai Denpun, a large fish food company. Mercian expects the market for condensed Chlorella to grow to annual sales of one billion yen within five years.

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