JAPAN ROUNDUP

Scientists in Kazuo Hashimoto's group at Kanazawa University's (Kanazawa) school of medicine have created an experimental animal model to study movement disorders. They have discovered that two widely used nitrile compounds—including crotononitrile—can induce a movement disorder in mice.

One or two days after these compounds are added to the animals' feed, the mice develop abnormal movements of the head and neck. Within one month, the mice begin to show an abnormal gait and frequently move in circles or walk backwards in their cages.

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Rotavirus-induced diarrhea causes the death of several million infants worldwide every year. Scientists at Taiyo Kagaku (Tokyo)—collaborating with Takuzaburo Ebina's group at Tohoku University (Sendai)—are developing two new methods to treat and prevent this disease.

The first method employs anti-rotavirus antibodies, which the researchers produce in chicken eggs. Using eggs is a much less expensive route than using animals to generate the antibodies. Twenty-two-and-one-half micrograms of antibody were sufficient to protect six-day-old mice against rotaviral infection.

The second approach uses a polyphenolic compound extracted from green tea. This substance inhibits viral growth; it prevents rotaviral infection of monkey cells *in vitro*.

The safety of the antibodies and the tea-derived compound are currently being tested as a first step towards using them as medicines and food supplements. The scientists are also exploring means for mass-producing both compounds.

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The research teams of Nobuhiko Katsunuma at Tokushima University's Enzymology Center (Tokushima) and Kiyoshi Takatsuki in the Department of Internal Medicine at Kumamoto University (Kumamoto) have discovered that the protease inhibitor trypstatin effectively prevents human immunodeficiency virus (HIV) from binding to helper T cells.

Trypstatin normally inhibits the activity of tryptase, a protease that functions in the clotting cascade.

The researchers found that trypstatin is 100-percent effective in blocking HIV replication, as well as its binding to T cells. Moreover, exposing T cells to antibodies that cross-react specifically with tryptase also blocks HIV binding.

According to Katsunuma, the scientists have established methods for the large-scale production of trypstatin and the anti-tryptase antibody. He adds that these results may shed additional light on the mechanism of HIV infection.

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Scientists at the Industrial Research Council's Research Institute for Industrial Microbiology (Tsukuba) have isolated the genes that allow certain bacteria to degrade polychlorinated biphenyls (PCBs), toxic chemicals that are a common component of industrial waste. Keitsuke Furukawa's research group determined that there are four PCB degradation genes, contained within a seven-kilobase segment of DNA from a pseudomonad they isolated from soil.

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Scientists in Hidehito Nakahara's group at Yamanashi Medical College (Yamanashi) have developed a novel cloning vector for monitoring the loss of plasmids from recombinant host cells. This vector includes the gene (*mer*T) for a mercury transport protein; cells that contain the engineered plasmid become extremely sensitive to mercury poisoning. Thus, any cells that spontaneously lose this plasmid become capable of growing in the presence of mercury. Nakahara, in collaboration with scientists from Washington University (St. Louis, MO), isolated the *mer*T gene from a mercury-resistant bacterial strain.

Because strains harboring recombinant plasmids often are highly unstable, and lose the plasmids during extended growth, the large-scale production of recombinant proteins often is inefficient. The ability to monitor plasmid loss may result in scientists being able to modify growth conditions that foster plasmid retention.

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Hokkaido University (Sapporo) scientists have developed an ultra-sensitive odorant detector using liposomes. The detector measures subtle changes in the physical properties of liposomes after they have absorbed small amounts of lipid-soluble compounds. According to Kazumi Kurihara, the sensitivity of the liposomes depends on their chemical composition. For instance, Kurihara says that amylacetate (a compound with a fruity odor) can be detected at a concentration of one microgram per liter by liposomes composed of 90 percent lecithin and 10 percent phosphatidylserine. By contrast, liposomes composed entirely of lecithin are one-million-fold less sensitive. Moreover, says Kurihara, individual odorants produce different perturbations in liposome structure.

The liposome sensor is 50,000-fold more sensitive than humans at detecting odors. If scientists can develop a practical sensing device, it could be used for detecting everything from industrial pollutants to illegal drugs. Such devices could also be used to monitor the quality of perfume and processed food.

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