

CENTER FOR TRANSGENIC ANIMALS AND PLANTS



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The worldwide genome project has almost been completed and research on basic biology has arrived at a post-genome era in which researchers are focusing on investigating the functions of individual genes. To promote the functional analysis of a gene of interest it is essential to utilize genetically altered model organisms generated using genetic engineering technology, including gene deletion, gene replacement and point mutation.

The NIBB Center for Transgenic Animals and Plants (CTAP) was established in April 1998 to support research using transgenic and gene targeting techniques at NIBB. The CTAP is managed by the head (professor, a concurrent post) and three associate professors.



Figure 1. The new center facility for transgenic animals in the Yamate area

Technical staff and supporting staff develop and promote research-supporting activities. A state-of-the-art facility for transgenic animals opened at the end of 2003 in the Yamate area.

The activities of the CTAP are as follows:

1. The provision of information, materials, techniques and animal housing space to researchers.
2. The use of various kinds of instruments to analyze mutant, transgenic, and gene-targeted animals and plants.
3. The development of novel techniques related to transgenic and gene targeting technology.
4. Cryopreservation and storage of transgenic strains.

I. Research support activities (mouse)

In 2001 the NIBB mouse facility (built under specific pathogen free (SPF) conditions) opened in the Myodaiji area and the production, breeding, analysis, cryopreservation and storage of genetically manipulated mouse strains has been conducted there since then. The new CTAP building in the Yamate area strengthened research activities using genetically altered organisms. The building has five floors and a total floor space of 2,500 m² in which we can generate, breed, store and analyze transgenic, gene targeting and mutant mice under SPF conditions. The mouse housing area was constructed based on a barrier system. This building is also equipped with breeding areas for transgenic small fish, birds and insects.



Figure 2. Liquid nitrogen storage equipment for cryopreservation

In 2008 (from January 1 to December 31) 3,509 mice and 1,126 fertilized eggs were brought into the CTAP in the Yamate area, and 37,137 mice (including pups bred in the facility) and 120 fertilized eggs were taken out.

A number of strains of genetically altered mice from outside the CTAP were brought into the mouse housing area by microbiological cleaning using the *in vitro* fertilization-

embryo transfer techniques, and stored using cryopreservation.

A new mouse facility in the Myodaiji area opened at the beginning of 2005. The facility provides research-supporting activities to researchers in the Myodaiji area. In 2008 (from January 1 to December 31) 11 mice were brought into the CTAP in the Myodaiji area, and 257 mice (including pups bred in the facility) were taken out.

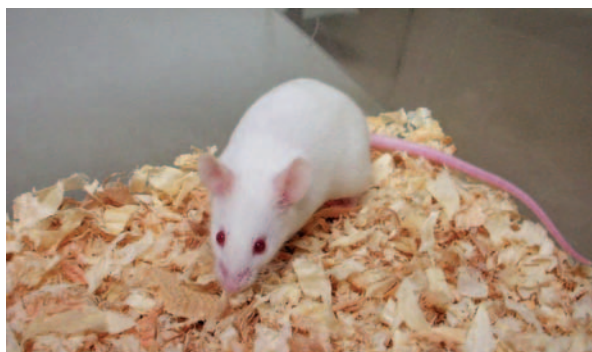


Figure 3. A laboratory mouse

II. Research support activities (small fish, birds, and insects)

The first floor of the CTAP building in the Yamate area provides space and facilities to maintain small fish, chick embryos, and insects. In a laboratory room for chick embryos, a large incubation chamber is equipped and set at 42 degrees (suitable for chick embryogenesis). For researchers who need fish, 480 tanks (1 liter) and 450 tanks (3 liters) are available for medaka and zebrafish, respectively. Water circulates and can be maintained to suit the conditions desired for fish breeding in the aquarium systems. Currently, five or more mutant lines and ten or more transgenic lines of medaka and zebrafish are maintained in our facility. In addition to the rooms mentioned above, another room is available for insects. All the rooms are qualified to meet the criteria for transgenic animals, allowing researchers to generate and maintain transgenic animals.

In 2008 (from January 1 to December 31), 10,442 medaka and zebrafish (124 eggs, 3,761 embryos and 6,557 adults) were brought to the facility and 82,929 medaka and zebrafish (75,521 fertilized eggs, 6,454 embryos and 954 adults, including animals bred in the facility) were taken out. In a laboratory for chick embryos 7,070 fertilized chicken eggs were brought in and 154 fertilized eggs and 10 chicken embryos were taken out. These animals were used for research activities in neurobiology and developmental biology.

In 2007 NIBB was selected as a core facility of the National BioResource Project of Medaka. We have supported the activities of NBRP Medaka by providing standard strains, induced mutants and transgenic lines and training personnel regarding fish maintenance.

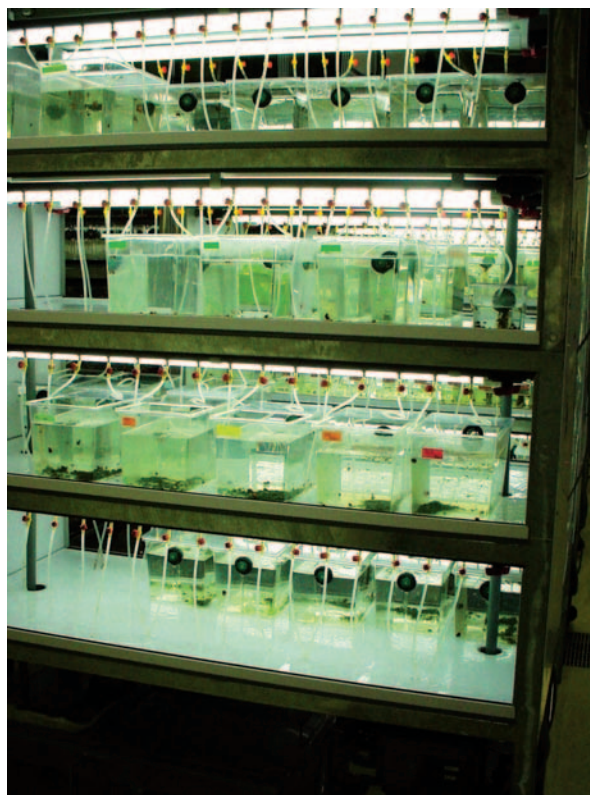


Figure 4. Breeding equipment for small fish

III. Academic activities

The associate professors of this center - E. Watanabe, T. Sasaoka and M. Tanaka - are the principal investigators of the Laboratory of Neurophysiology, the Laboratory of Neurochemistry and the Laboratory of Molecular Genetics for Reproduction, respectively. The Laboratory of Neurophysiology is studying the brain sensing system for body fluid water and sodium homeostasis using gene-targeting mice. The Laboratory of Neurochemistry is studying the physiological role of the dopaminergic system using genetically altered mice. The Laboratory of Molecular Genetics for Reproduction is studying the molecular mechanisms of reproductive organ development and sex differentiation using mutagenized or transgenic medaka. For details, please refer to the academic activities of each laboratory.