NATIONAL BIORESOURCE PROJECT

The major purpose of the National BioResource Project (NBRP) is to collect, preserve, and provide bioresources (such as experimental animals and plants) that are essential experimental materials for life sciences research. The project also aims to improve the bioresources by increasing their value through enriching genome information and developing fundamental technologies for preservation and other necessary procedures, in order to meet to the current scientific demands. NIBB serves as the core organization center of the medaka bioresource and as sub-centers of the morning glory and the zebrafish bioresources.

I. NBRP Medaka (*Oryzias latipes*)

Project Manager: *NARUSE, Kiyoshi*
Sub Managers: *KAMEI, Yasuhiro*
ANSAI, Satoshi

NBRP medaka provides three groups of resource worldwide, including 1) live medaka resources comprising more than 600 strains (strains for general use, wild populations, related species, inbred strains, mutants, and transgenics), 2) genome resources (ca. 400 thousand cDNA clones originated from 33 cDNA libraries, and BAC/Fosmid clones covering the whole medaka genome), and 3) hatching enzyme necessary for manipulation and live imaging of the medaka embryo. Entries for these resources can be searched by various methods such as keywords, sequence homology, and expression profile on the web site (https://shigen.nig.ac.jp/medaka/).

We provide mutant gene screening using the HRM method in the TILLING library, and also provide a genome editing platform using CRISPR/Cas9. Using collaborative research support, researchers can visit NIBB to generate mutants by genome editing. We developed and provided a new genome browser (http://viewer.shigen.info/medaka/index.php) using a recently published genome assembly by PacBioRSII.

Summary of previous accomplishments are as follows. In 2007-2009, we sequenced both ends of 260,000 clones originated from 11 kinds of full-length cDNA libraries and sequenced the whole length of 17,000 independent clones. We also developed strains in which CRE-recombinase can be expressed in any cell lineages using a heat shock promoter, and started to provide strains (TG918, TG921, etc) established using this method. In 2010, we re-sequenced the genomes of five inbred strains by coverage corresponding to genome 100X (http://medaka.lab.nig.ac.jp/service/menu). In 2012, we developed a vitrification freezing preservation method of the testicular tissue. We are now providing a backup preservation service of testicular tissues using this method.

NBRP Medaka fish facility to collect, maintain and supply the five medaka.

II. NBRP Morning Glory (*Ipomoea nil*)

Project Manager: HOSHINO, Atsushi

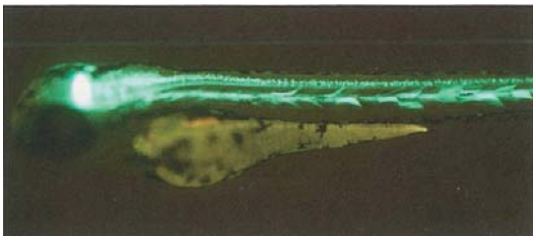
The Japanese morning glory (*Ipomoea nil*) is a traditional floricultural plant in Japan, and is studied worldwide, especially in plant physiology and genetics. NIBB collects, develops and distributes DNA clones, mutant lines for flower pigmentation, and transgenic lines as a sub-center of the National BioResource Project (NBRP) Morning Glory, and collaborates with the core organization center, Kyushu University. We collected several mutant lines, and provided 122 mutant lines and 4 DNA clones to both local and international biologists in 2017. A database for the whole genome sequence of *I. nil* was updated.

Various colors of morning glory flowers. The color depends not only on the molecular structure of the pigment, but also on the pH of the vacuole where the pigment is accumulated.

III. NBRP Zebrafish (*Danio rerio*)

Project Manager: HIGASHIJIMA, Shin-ichi

NIBB is a sub-center of the National BioResource Project (NBRP) Zebrafish, and collaborates with the core organization center, RIKEN Brain Science Institute. We at NIBB mainly collect zebrafish strains expressing fluorescent proteins in specific cells of the central nervous system and distribute them to researchers worldwide. Zebrafish is an important and globally used experimental vertebrate model animal with a simple body structure, it allows genetic manipulations, and its embryos are transparent enough for optical observations. Researches using zebrafish for the studies of neural development and neural circuit functions are growing rapidly worldwide, and the importance of strains collected and provided by NIBB to researchers is growing accordingly.



An example of transgenic fish generated by the CRISPR/Cas9-mediated knock-in method.