

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 for life sciences research. The project also aims to improve these bioresources by increasing their value by enriching their genome information and developing key preservation technologies and other necessary procedures, in order to meet current scientific demands. NIBB serves as the core organization center of medaka bioresources and as a sub-center of morning glory and the zebrafish bioresources.

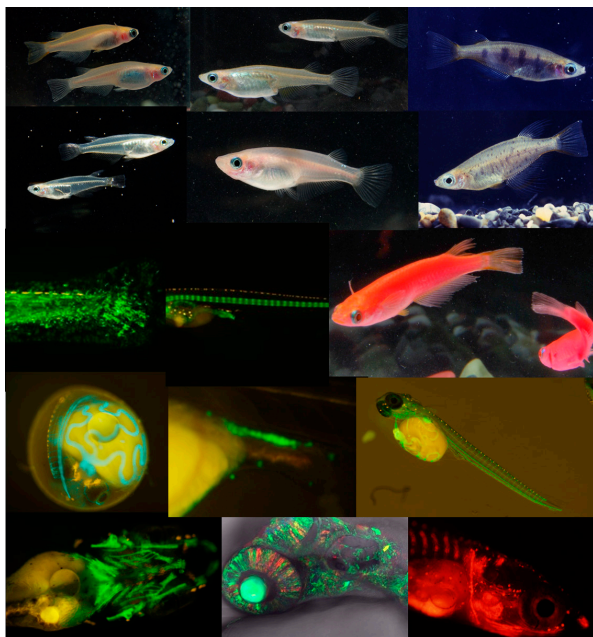
I. NBRP Medaka (*Oryzias latipes*)

Project Manager: NARUSE, Kiyoshi

NBRP Medaka provides three groups of resources 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 enzymes necessary for manipulation and live imaging of the medaka embryos. Entries for these resources can be found by various methods such as keyword searches, sequence homologies, and by opening the expression profile on the following web site (<https://shigen.nig.ac.jp/medaka/>).

We provide a genome editing platform using CRISPR/Cas9. Using collaborative research support, researchers can visit NIBB to generate mutants by genome editing.

With the approval of the second supplementary budget for FY2020, we were able to install a cabinet-type fish tank washing machine. This has freed up our technical support staff from the need to wash the tanks by hand and has allowed us to focus more on breeding and management, which requires more human work. In addition, a system to remotely monitor the temperature, humidity, and illumina-



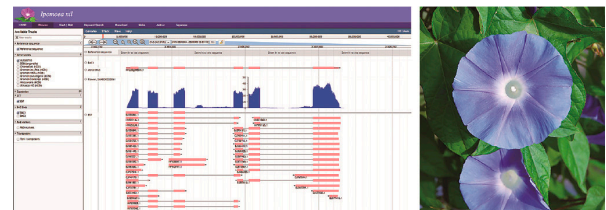
Medaka resources provided from NBRP medaka

tion in the medaka breeding rooms and the water temperature in the breeding tanks was installed. The air conditioner in the breeding room was also upgraded. We have continuously monitored the medaka breeding conditions using these systems. In the collection of individual resources, we collected 26 strains (achievement rate 173%). As a result, the entire core institute now has 730 strains (achievement rate 125%). A total of 411 strains (achievement rate 117%) were provided. 76 DNA clones were provided (achievement rate 38 %). As of FY2021, 395 hatching enzyme tubes (achievement rate 197%) were provided; thus the numerical targets for collection, conservation, and provisioning were met for the entire project, except for the number of clones provided. To enhance online contents, “The Life of My Master Dr. Tatsuo Aida” (edited by Tetsuro Takeuchi), “Biological Experiments for Elementary, Middle, and High School Students” (written by Kunisuke Takeuchi), and “Medaka Experiments Anyone Can Do” (written by Kunisuke Takeuchi) were released from NBRP Medaka in April 2021. In October 2021, a new database, “3D atlas and single cell transcriptome data of medaka pituitary” was made available on NBRP Medaka. On September 16-17, 2021, we participated in the 27th Small Fish Research Meeting, as well as the Small Fish Community Meeting. The 44th Annual Meeting of the Molecular Biology Society of Japan (December 1-3, 2021, Pacifico Yokohama) was held onsite, and we promoted the project with Utsunomiya University at a booth at the “National BioResource Project (NBRP) - A lineup of bioresources.

II. NBRP Morning Glory (*Ipomoea nil*)

Project Manager: HOSHINO, Atsushi

Japanese morning glory (*Ipomoea nil*) is a traditional floricultural plant in Japan. Studied worldwide, it is commonly investigated in the fields of 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 in collaboration with the core organization center at Kyushu University. From April 2021 to March 2022, we collected 10 mutant lines and 6 transgenic lines. Additionally, we provided 10 mutant lines, 2 transgenic lines, and 13 DNA clones to both local and international biologists. Finally, we analyzed whole-genome sequences of 100 mutant lines using next-generation sequencers to develop genetic variation databases.

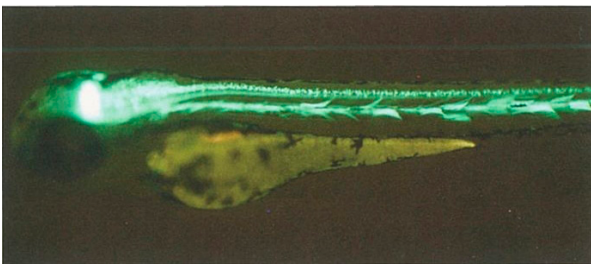


Left: The genome database (<http://viewer.shigen.info/asagao/>) containing the whole-genome sequence, transcriptome sequences, and end sequences of the EST and BAC clones. Mutation sequence information links the genome and mutant databases. Right: A mutant flower phenotype

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 mainly collect zebrafish strains expressing fluorescent proteins in specific cells of the central nervous system and distribute them to researchers worldwide. The zebrafish is an important and globally used experimental vertebrate model animal with a simple body structure. It can be genetically manipulated, and its embryos are transparent enough for optical observation. Research 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.