

## 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.

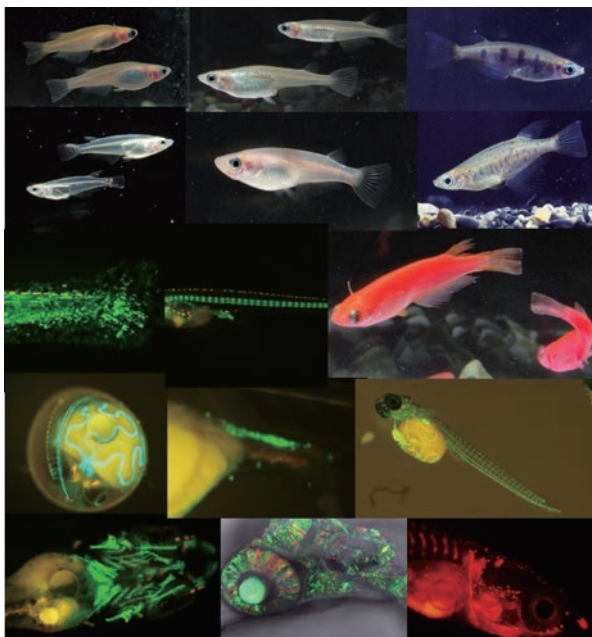
### I. NBRP Medaka (*Oryzias latipes*)

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 2020, All on-site conferences were cancelled due to the new coronavirus pandemic, and public relations activities were shifted to online. As a new attempt under this situation, NIBB and the ICOB, Academia Sinica, Taiwan, jointly organized the “NIBB-Academia Sinica International Webinar of Aquatic Model Organisms for Basic Biology to Human Disease Models” Total of 100 peoples from Japan, Taiwan, China, Indonesia, India, Singapore, Germany, Poland, Switzerland, the Netherlands, Ukraine, the U.S., Canada, and Argentina registered for the webinar. The active use of webinars, which are not limited by location, is one way to promote NBRP medaka under the new coronavirus era.

### II. NBRP Morning Glory (*Ipomoea nil*)

Project Manager: HOSHINO, Atsushi

The Japanese morning glory (*Ipomoea nil*) is a traditional floricultural plant in Japan, that is studied worldwide, and is especially 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, and collaborates with the core organization center at Kyushu University. From April 2020 to March 2021, we have also collected several mutant lines, and provided 14 mutant lines and 39 DNA clones to both local and international biologists. We also analyzed the whole genome sequences of the 100 mutant lines using next-generation sequencers to develop databases for genetic variations.



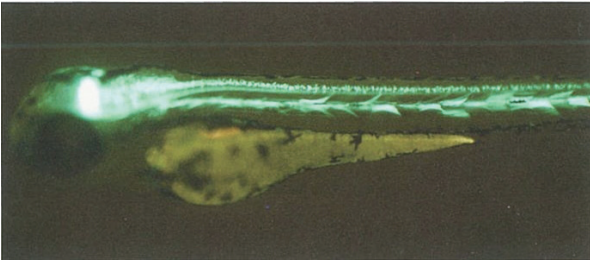
Left: The genome database (<http://viewer.shigen.info/asagao/>) contains the whole genome sequence, the transcriptome sequences, and the end sequences of the EST and BAC clones. The genome and mutant databases are linked by the sequence information of the mutations. Right: The flower phenotype of a mutant line.

### 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 obser-

vation. 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.