

## GOALS OF THE NIBB

NIBB has set five goals for its activities in pursuing the progress of biology. We envision contributing to the worldwide community of biologists through our efforts to accomplish these goals. This chapter briefly explains four of the goals. The last goal, the promotion of academic research, is accomplished through our research activities, which are introduced throughout this brochure.

### Promotion of Collaborative Research

#### ■ Collaborative Research Projects

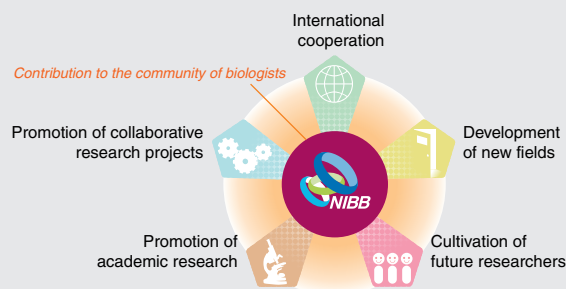
Research projects in collaboration with the NIBB's divisions/laboratories and research activities to be conducted using the NIBB's facilities are solicited from external researchers at other universities and institutes. In addition to conventional "individual collaborative research projects," "collaborative experiments using the Large Spectrograph," and "NIBB workshops," new types of research projects are solicited that will facilitate the strategic organization of collaborative research projects. "Priority collaborative research projects" are carried out in one to three years as group research by internal and external researchers with the purpose of developing pioneering research fields in biology. Three projects have already been carried out, including "molecular mechanisms for controlling the individuals of higher plants." The category of "collaborative research projects for model organism/technology development" was established in 2007 with the aim of developing and establishing new model organisms. Two projects have already been carried out, including "development of the transgenic strain of *Cabombaceae* (primitive angiosperm)." In the belief that the methods of conducting collaborative research projects must be constantly modified according to the demands of the age and the biology community, the NIBB always encourages discussion on such projects.

#### Collaborative research projects by year

year	2005	2006	2007
Priority collaborative research projects	2	3	1
Collaborative research projects for model organisms/technology development	—	—	2
Individual collaborative research projects	41	37	34
NIBB workshops	4	1	1
Collaborative experiments using the Large Spectrograph	19	18	12
total	64	59	50

#### ■ Enhancement of the Large Spectrograph

The Large Spectrograph Laboratory, a world-leading research facility in photobiology, has succeeded in a large number of collaborative research projects since its foundation in 1980. To ensure further high-level achievements, the Laboratory has promoted the enhancement of its laboratory equipment, including advanced control systems, the use of laser sources, and sophisticated analysis equipment. To supplement the



currently operating fixed (partly tunable) wavelength laser sources, the introduction of tunable laser sources covering a wide range of wavelengths from UV to IR is in preparation.

### International Cooperation

#### ■ Collaborative research projects with the EMBL

The European Molecular Biology Laboratory (EMBL), established in 1974, is a research institute funded by 18 European. It conducts comprehensive, high-level basic research programs and leads the world in the field of molecular biology. The NIBB takes the leading role in collaborative research programs between the EMBL and the National Institutes of Natural Sciences (NINS), which were launched in 2005, and promotes personal and technological exchange through symposia, exchange between researchers and graduate students, and the introduction of experimental equipment (see page 83 for details of the EMBL meeting held in 2007).



Seminar (left) and discussions (right) in EMBL, Heidelberg

#### ■ NIBB Conference

The NIBB Conference is an international conference organized by the NIBB's professors once or twice a year with the participation of a guest lecturer from abroad. Since the first conference in 1977 (the year of the NIBB's foundation), the NIBB Conference has provided researchers in basic biology with valuable opportunities for international exchange.

#### ■ International Practical Course

With the cooperation of researchers from Japan and abroad, the NIBB international practical course, a practical training course, is given at the laboratory specifically prepared for the course at the NIBB. The first course, titled "Developmental Genetics of Zebrafish and Medaka," was held in 2007. Graduate students from various East Asian nations and areas, including China, Hong Kong, Taiwan, and India, were provided with training in state-of-the-art techniques for small fish research.

## Bio Resources

The National BioResource Project (NBRP) is a national project for the systematic accumulation, storage, and supply system of nationally recognized bio resources (experimental animals and plants, cells, DNA, and other genetic resources), which are widely used as materials in life science research. To promote this national project, the NIBB has been appointed as a research center for research on "Medaka (*Oryzias latipes*)" whose usefulness as a vertebrate model first developed in Japan. The usability of Medaka as a research material in biology has drawn increasing attention since its full genome sequence recently became available. The NIBB also works as a sub-center for this national project for research on Japanese morning glory and Zebrafish. In addition, the NIBB provides databases containing research data on the moss *Physcomitrella patens*, *Daphnia*, *Xenopus laevis*, plant cell organelles, and bacterial genomes.



Top: Medaka strain for which the full genome sequence was determined.  
Middle: Transgenic Medaka with red fluorescence  
Bottom: A strain with transparent body

## Development of New Fields of Biology

### Bioimaging

Recently, the capability of optical microscopes has greatly improved, and biophotonics probes have also been developed. The combination of these technologies allows us to use living samples and observe biological phenomena in real time, which, in the past, could only be estimated based on fragmentary information from fixed samples. The NIBB aims to maximize the application of these techniques for visualizing biological phenomena (bioimaging) in biological research and to develop new imaging techniques.

- 1) *Imaging Science Laboratories* The NIBB aims to be a center for developing microscopes and biophotonics probes.
- 2) *Advisory Committee on Bioimaging* Regular meetings are held with several leading researchers in the bioimaging field in Japan to formulate advice on imaging research.
- 3) *Bioimaging Forum* This provides an opportunity for researchers in the NIBB, members of the Advisory Committee, and company engineers to frankly discuss practical difficulties and needs regarding imaging.
- 4) *Introduction of DSLM (Digital Scanned laser Light sheet Microscopy)* As part of collaborative work with the EMBL, the NIBB has introduced DSLM, which is effective for the three-dimensional observation of living samples, and is the first of its kind in Japan.
- 5) *Bioimaging Symposium* This provides an opportunity for academic exchanges with overseas cutting-edge researchers in the imaging field, mainly from the EMBL.



Optical path of the DSLM

### Okazaki Biology Conferences

The NIBB holds Okazaki Biology Conferences (OBC) that, with the endorsement of the Union of Japanese Societies for Biological Science, support the formation of international communities in future biological research fields with the goal of identifying new research issues in biology. Dozens of top-level researchers from Japan and abroad spend about one week together in exhaustive discussions seeking strategies for addressing future critical issues in biology. Past Conferences have promoted the formation of international researcher communities. (see page 81 for OBCs held in 2007)

### Cultivation of Future Researchers

The NIBB sponsors two education programs for graduate students.

#### 1. Graduate University for Advanced Studies

NIBB constitutes the Department of Basic Biology in the School of Life Science of the Graduate University for Advanced Studies (SOKENDAI). The department provides a five-year course for university graduates and a three-year doctoral course for graduate students with a master's degrees.

#### 2. Graduate Student Training Program

Graduate students enrolled in other universities and institutions can apply to be special research students eligible to conduct research for fixed periods of time under the supervision of NIBB professors.

In both cases above, graduate students can live an academic life and receive financial support from the NIBB based on the research assistant (RA) system.

### Graduate students educated by NIBB

