

GOALS OF THE NATIONAL INSTITUTE FOR BASIC BIOLOGY

The National Institute for Basic Biology (NIBB) has set five goals for its activities in pursuing the progress of biology. We contribute to the world-wide community of biologists through our efforts to accomplish these goals. This chapter briefly explains four of these 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 Support

Research activities in collaboration with NIBB's divisions/laboratories using NIBB's facilities are solicited from external researchers. "Individual collaborative research projects" are the basic form of collaboration support which provide external researchers with travel and lodging expenses to visit NIBB's laboratories for collaborative research. "NIBB workshops" support travel expenses for discussions and meetings at NIBB. For the use of NIBB's unique and excellent research instruments, such as the large spectrograph, the DSLM, and next generation DNA sequencers experimental projects are solicited and reviewed to provide machine time and travel expenses. These instruments are managed by special facilities to maintain efficient and precise operation. "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 and the "collaborative research projects for model organism/technology development" are for developing and establishing new model organisms and new research technology. For these projects, research expenses in addition to travel expenses are provided.

Collaborative research projects by year

year	2007	2008	2009	2010
Priority collaborative research projects	1	0	1	4
Collaborative research projects for model organisms/ technology development	2	3	3	2
Individual collaborative research projects	43	49	54	68
NIBB workshops	5	5	3	3
Collaborative experiments using the large spectrograph	14	11	10	8
Collaborative experiments using the DSLM	—	—	—	7
Collaborative experiments using next generation DNA sequencers	—	—	—	11
Facility Use (Training Course Facility)	—	—	—	1
total	65	68	71	94

■ NIBB Core Research Facilities

The NIBB Core Research Facilities were launched in 2010 to support research in NIBB and also to act as an intellectual hub to promote collaboration among the researchers of NIBB and other academic institutions. They consist of three facilities that are developing and providing state-of-the-art technologies through functional genomics, bioimaging and bioinformatics (see page 74).

The Functional Genomics Facility maintains a wide array of core research equipment, including cutting edge tools such as next generation DNA sequencers. The facility is dedicated to



fostering NIBB's collaborative research by providing these tools as well as expertise. The current focus is supporting functional genomics works that utilize mass spectrometers and DNA sequencers. The Spectrography and Bioimaging Facility manages research tools, such as confocal microscopes, DSLM and the large spectrograph, and provides technical support and scientific advice to researchers. These two facilities hold specially-appointed associate professors, an expert in each field, with a mission to manage each facility as well as conducting his own academic research. The Data Integration and Analysis Facility supports large-scale biological data analysis, such as genomic sequence analysis, expression data analysis, and imaging data analysis. For this purpose, the facility maintains high-performance computers with large-capacity storage systems.

International Cooperation and Outreach

■ Collaborative Programs with Overseas Institutes

NIBB takes a leading role in the collaborative research programs between the European Molecular Biology Laboratory (EMBL), a research institute established in 1974 and funded by 21 mostly European countries, and the National Institutes of Natural Sciences (NINS) and promotes personal and technological exchange through joint meetings, exchange between researchers and graduate students, and the introduction of experimental equipment.

NIBB formed an agreement with the Max Planck Institute for Plant Breeding Research (MPIPZ) in April 2009 to start a new initiative aimed at stimulating academic and scholarly exchange in the field of plant sciences. NIBB and MPIPZ work together to plan and promote joint research projects, collaborative symposia, training courses and student exchange programs. NIBB acts as a bridge between Japanese and German researchers in the field of plant sciences. In 2010, the Second NIBB-MPIPZ Joint Symposium "Plant Science Communications 2010" was held (page 89).

Collaborative programs have also been started with the Temasek Life Sciences Laboratory (TLL), of Singapore and Princeton University. Researchers from TLL participated in a NIBB-MPIPZ joint symposium in 2010 (see page 89).

■ NIBB Conference

The NIBB Conferences are international conferences on hot topics in biology organized by NIBB's professors. Since the first conference in 1977 (the year of NIBB's foundation), NIBB Conferences have provided researchers in basic biology with valuable opportunities for international exchange. In 2010, the 56th conference "Neocortical Organization" (page 87) and the 57th conference "The

Dynamic Genome” (page 88) were held.

International Practical Course

With the cooperation of researchers from Japan and abroad the NIBB international practical course, a practical training program, is given at a laboratory specifically prepared for its use at NIBB. The fifth course “Developmental Genetics of Zebrafish and Medaka III” was held in 2010 (see page 90). Graduate students and young researchers from various areas including Taiwan, Germany, China, and Singapore, were provided with training in state-of-the-art research techniques.

Bio-Resources

The National BioResource Project (NBRP) is a national project for the systematic accumulation, storage, and supply 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, NIBB has been appointed as a center for research on “Medaka (*Oryzias latipes*)” whose usefulness as a vertebrate model was first shown by Japanese researchers. The usability of Medaka as a research material in biology has drawn increasing attention since its full genome sequence recently became available. NIBB is also a sub-center for the NBRP’s work with Japanese morning glory. The NIBB BioResource Center has equipment, facilities, and staff to maintain Medaka and Japanese morning glory safely, efficiently, and appropriately. The center also maintains other model organisms, such as mice, zebrafish, *Arabidopsis*, *Lotus japonicus*, and *Physcomitrella patens*, and provides technical support and advice for the appropriate use of these organisms (see page 79).



Strains of Japanese morning glory maintained in the center

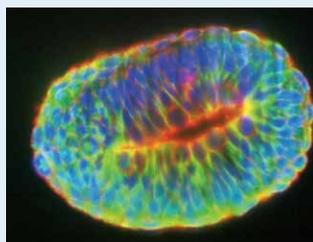
Outreach

NIBB’s outreach activities aim to present cutting edge research results to the public via mass media through press releases or directly through the internet. Our triennial open campus event was held in 2010 at which we welcomed more than 3,200 local citizens. NIBB also cooperates in the education of undergraduate and younger students through lectures and workshops. Outreach activities are mostly managed by the Office of Public Relations and International Cooperation (see page 84).

Development of New Fields of Biology

Bioimaging

NIBB aims to maximize the application of modern light microscopes and biophotonic probes for real time visualization of biological phenomena and to develop new imaging techniques. As part of our collaborative work with EMBL, NIBB introduced a DSLM, which is effective for the three-dimensional observation of living samples, and has



DSLM image of mouse 6.5 day embryo.
Blue: DNA, Green: microtubules, Red: cortical actin.

developed an improved model (see page 73). The Advisory Committee on Bioimaging, comprised of leading researchers in the bioimaging field in Japan, is organized to formulate advice on NIBB’s imaging research. The Bioimaging Forum provides an opportunity for researchers at NIBB, members of the Advisory Committee, and company engineers to frankly discuss practical difficulties and needs regarding imaging. Bioimaging Symposium provides an opportunity for academic exchange with cutting-edge overseas researchers in the imaging field, mainly from EMBL.

Okazaki Biology Conferences

NIBB holds Okazaki Biology Conferences (OBC) that, with the endorsement of the Union of Japanese Societies for Biological Science, aim to explore new research fields in biology and support the formation of international communities in these fields. Dozens of top-level researchers from Japan and abroad spend nearly one week together for intensive discussions seeking strategies for addressing future critical issues in biology. Past Conferences have promoted the formation of international researcher communities. In 2010, OBC7 “The Evolution of Symbiotic Systems” was held (page 86).

Cultivation of Future Researchers

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 degree.

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 NIBB based on the research assistant (RA) system from the beginning of the five-year course.

Due to the international collaboration with EMBL, graduate students are encouraged to attend Ph.D. student symposia held at EMBL, Heidelberg and provided an opportunity to give platform presentations as well posters, at least one time during their master’s and doctoral program.

