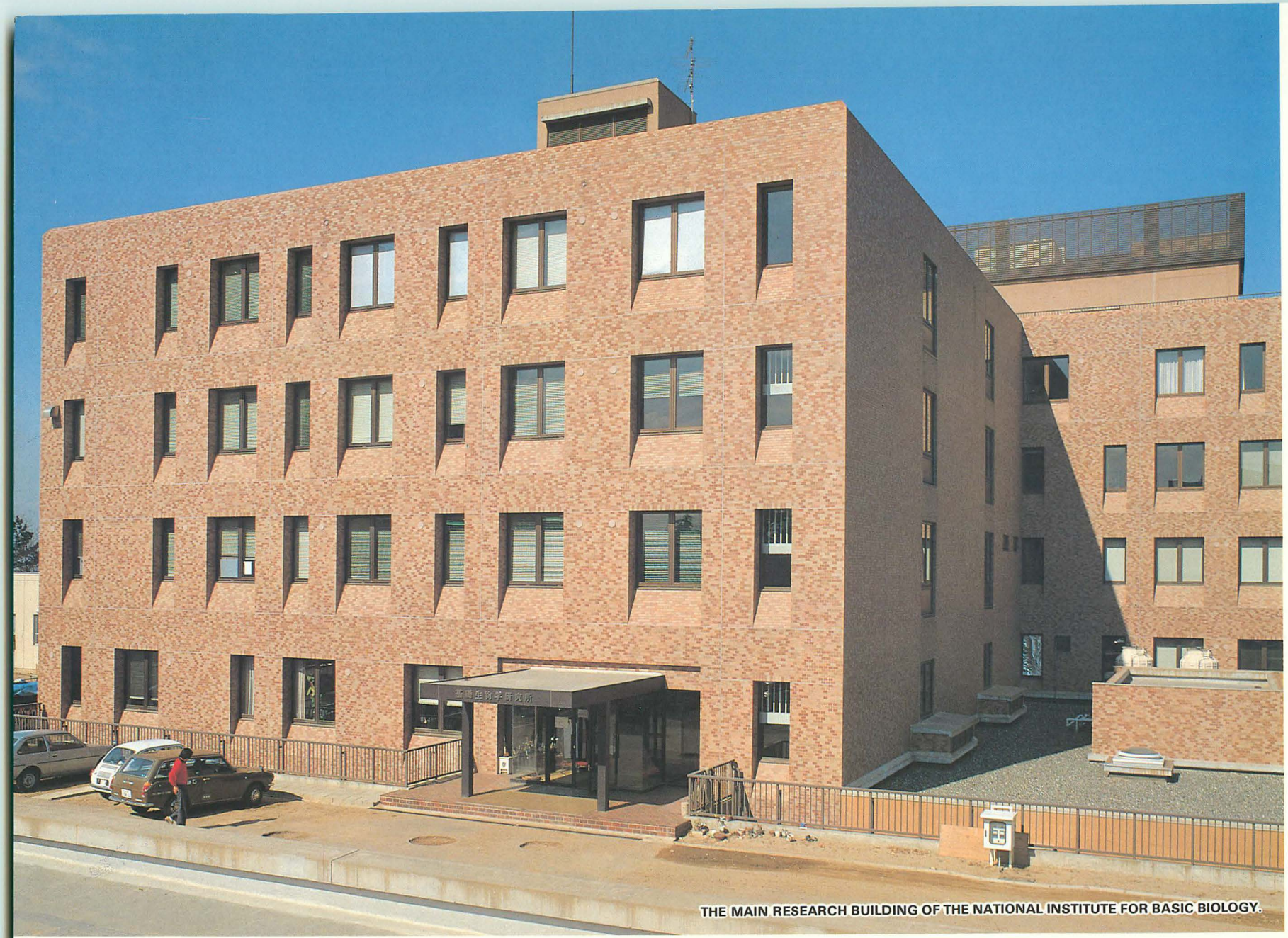
NATIONAL INSTITUTE FOR BASIC BIOLOGY

基 礎 生 物 学 研 究 所　岡崎国立共同研究機構

1984

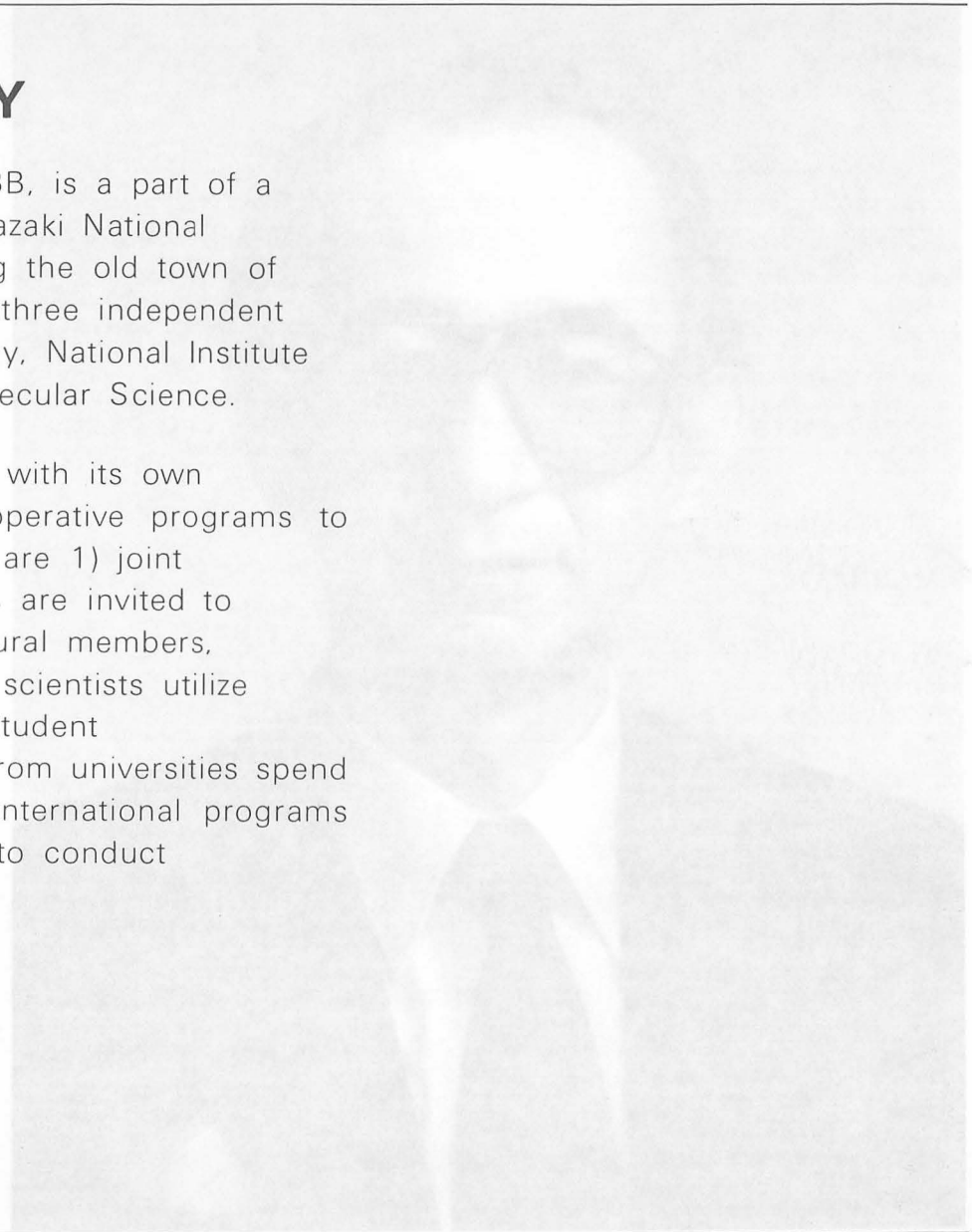


THE MAIN RESEARCH BUILDING OF THE NATIONAL INSTITUTE FOR BASIC BIOLOGY.

BRIEF SUMMARY

The National Institute for Basic Biology, NIBB, is a part of a newly-established research organization, the Okazaki National Research Institutes located on a hill overlooking the old town of Okazaki. The research institute is composed of three independent organizations, National Institute for Basic Biology, National Institute for Physiological Sciences and Institute for Molecular Science.

NIBB is an interuniversity research institute with its own intramural research programs as well as cooperative programs to promote basic biology in Japan. The programs are 1) joint research programs in which university scientists are invited to participate in research projects with the intramural members, 2) facility-sharing programs in which university scientists utilize the institute's research resources, 3) graduate student training programs in which graduate students from universities spend fixed periods of time with the NIBB, and 4) international programs in which foreign scientists are invited to NIBB to conduct research projects.



DR. T.S. OKADA

INTRODUCTION

The National Institute for Basic Biology (NIBB) aims to facilitate the basic researches in biological sciences in Japan by conducting the most advanced studies to elucidate several fundamental mechanisms underlying living organisms. Research areas include control mechanisms in reproduction, cell division and differentiation, biological rhythms, photobiology and vision physiology. Analytical approaches range from the molecular to organismic levels of organization.

For many years there has been a serious desire, among Japanese biologists, to have a national research center for biology. The desire materialized in May 1977 when Diet passed a bill to authorize the NIBB in Okazaki, a city close to Nagoya in the center of the Japanese archipelago. At the same time, a sister institute, the National Institute for Physiological Sciences, also a long awaited, was approved. The two institutes collaborate closely, sharing many important facilities but keeping their own identity.

The NIBB, which is an interuniversity research institute and is still under development, has a two-fold mission: to conduct researches by its own staffs and those by collaboration with scientists outside NIBB. The former mission is discharged by the 13 divisions organized into three departments, the Departments of Cell Biology, Developmental Biology, and Regulation Biology. Each division has a full professor and an associate professor and two research associates. Of the 13 divisions, 6 are for adjunct professorships with joint appointment with other institutes in Japan. For the latter mission, the NIBB sponsors joint research programs with participating individuals or research groups throughout Japan.

The NIBB provides research resources to be shared among biologists in Japan as well from abroad. The NIBB sponsors symposia on up-to-date topics at the interdisciplinary level by inviting leading scientists from related fields both from inside and outside Japan. Thus, the NIBB expects to contribute the progress in biological science nationally as well as internationally.

T.S. Okada, D.Sci.
Director General
National Institute for Basic Biology.

ORGANIZATION OF THE INSTITUTE

Policy and Decision Making

The Director General oversees the operation of the institute assisted by two advisory bodies, the Advisory Council and Steering Council. The Advisory Council is made up of distinguished scholars representing various fields of science and culture and advises the Director General on the basic policy of the institute. The Steering Council is made up of professors of the institute and an equal number of professors from other leading universities in Japan and advises the Director General on the scientific activities, intramural as well as extramural, of the institute. The Council advises on faculty appointments and on the institute's annual budget.

Administration

Administration of the institute is undertaken by the Administration Bureau of the Okazaki National Research Institutes under the direct auspices of the Ministry of Education, Science and Culture. Currently the chief administration officer is Mr. Akira Muroya (—Nov. 1984) [Mr. Katsuhiko Kurioka (Dec. 1984—)].

Research

The institute conducts its intramural research programs through three departments organized into 13 divisions. Each division has its own research project and is staffed by a professor, an associate professor and two research associates. A division forms a project team and is expected to be reorganized when a division's project is completed. Half of the divisions are for adjunct professorship and are under professors who hold joint appointment with other universities. The adjunct division has resident research associates. The arrangement aims to facilitate exchange of research activities in Japan.

Technical Department manages the activities of research techniques and help to promote research activities of each division and also to maintain the research resources of the institute. The department undertakes the technical education of its staff.

Research Support Facility

The intramural research support facility of NIBB includes the Large-scale Spectrograph Laboratory, Tisue and Cell Culture Laboratory, Laboratory Computer Facility, Plant Culture Facility, Plant Cell Culture Facility, and Experimental Farm. In addition, seven facilities are operated jointly with the National Institute of Physiological Sciences; they include Radioisotope Facility, Electron Microscope Center, Center for Analytical Instruments, Machine Shop, Glassware Cleaning Facility, Animal Care Facility, and Low-Temperature Facility.

Campus

The Okazaki National Research Institutes cover an area of 150,000 sq.m. with four principal buildings. The NIBB's main research building has a floor space of 10,930 sq.m. Two thirds of the space had been completed by 1982 and the remaining third was constructed by June, 1983. The buildings to house research support facility was also completed by June, 1983.

DEPARTMENT OF CELL BIOLOGY

Chairman : Yoshihiko Fujita

The department is formed by two research divisions and three adjunct research divisions and conducts research on the fundamentals of structure and function of cells at molecular level.

Division of Cell Mechanisms

Professor : Tsuneyoshi Kuroiwa
Associate Professor : Toshiyuki Nagata
Research Associate : Shigeyuki Kawano
Kazuo Ogawa

Using various cell biological approaches, research in this division is designed to study the mechanisms of inheritance and proliferation of semiautonomous organelles like mitochondria and chloroplasts. These organelles contain spherical or rod-shaped organelle nuclei composed of DNA, RNA and proteins which are duplicated during organelle-nuclear division. Soon after mating of female and male gametes, the chloroplast nuclei of male origin disappear preferentially while those of female origin persist and are transmitted to progeny. Probably this is a cellular mechanism of maternal inheritance of organelles. Main projects in our division involve clarification of the molecular basis for mitochondria-nuclear division and for preferential destruction of male chloroplast nuclei.

Division of Bioenergetics

Professor : Yoshihiko Fujita
Associate Professor : Shigeru Itoh
Research Associate : Mamoru Mimuro
Kaori Ohki

Mechanism of biological energy conversion in photosynthesis has been investigated. Special attention has been paid to the mechanism of light-capturing and energy transfer in the photosynthetic pigment system and the mechanism of energy conversion, from electric to biochemical, in the thylakoid membranes. Molecular architecture and energy flow in phycobilin system of red and blue-green algae are the main targets in the former; mechanism of chromatic adaptation of the pigment system has been also studied. The main focus in the latter is the membrane potential formation driven by electron flow in thylakoid membranes; electron flow mechanism itself has been also studied with special attention to the O_2-evolving system.

Division of Cell Fusion (Adjunct)

Professor : Yoshio Okada
Associate Professor : Masaru Yamaizumi
Research Associate : Masahiro Ishiura
Kenji Kohno

Biology and genetics of cultured mammalian cells including human cells, utilizing cell engineering techniques based on cell fusion phenomenon by HVJ (Sendai virus) and microorganisms or their derivatives are proposed as the research projects for this Divison.

Division of Cellular Communication (Adjunct)

Professor : Yasutomi Nishizuka
Associate Professor : Yoshimi Takai
Research Associate : Keisuke Hirasawa (~Jun. 1984)

Cellular function and proliferation are frequently activated by interaction of extracellular messengers with specific cell surface receptors, and the mechanism of such activation, particular of transmission of information across the cell membrane has attracted great attention. The main project currently under way in this division is to explore the molecular basis of hormone actions as well as of other cell to cell communication. Along this line an entirely new receptor function has been recently uncovered. The function is independent of cyclic nucleotides but is directly coupled to phosphatidylinositol turnover provoked by various extracellular signals. Calcium, together with diglyceride derived from this phospholipid turnover, specifically activates a multifunctional protein kinase which plays roles of crucial importance for controlling a wide variety of cellular activities through protein phosphorylation.

Division of Cell Proliferation (Adjunct)

Professor : Yukio Hiramoto
Associate Professor: Issei Mabuchi
Research Associate: Yasuaki Yoshimoto

The division conducts research on the mechanism of cell division and the cell cycle through physiological, biochemical and morphological approaches. Main projects are to explore mechanisms of the synthesis of proteins and nucleic acids at various stages of cell cycle, the formation of the mitotic apparatus, the movement of chromosomes and the cytokinesis.

DEPARTMENT OF DEVELOPMENTAL BIOLOGY

Chairman : Goro Eguchi

The department is composed of three research divisions and one adjunct research division, and conducts research into the cellular and molecular mechanisms of various processes which are involved in developmental phenomena.

Division of Reproductive Biology

Associate Professor : Yoshitaka Nagahama
Research Associate : Hiroko Shirai
Takeo Kishimoto

The division conducts research into two major areas of the reproductive process: (1) the cellular and molecular mechanisms of formation and release of gametes, particularly the hormonal control of oocyte maturation and ovulation, and (2) mechanisms involved in fertilization. These studies combine biochemical, fine structural and physiological approaches.

Research centers around oocyte maturation in starfish. In this invertebrate species a hormonal substance, gonad-stimulating substance (GSS) secreted by the radial nerves, acts on the ovarian follicle cells to produce a second mediator of maturation, maturation-inducing substance (MIS), 1-methyladenine (1-MeAde). 1-MeAde acts on the surface of the

oocytes to induce formation of the third mediator of maturation within the oocytes, maturation-promoting factor (MPF) which brings about germinal vesicle breakdown. Current research is as follows: (1) the characterization and synthesis of GSS, (2) the mechanisms of biosynthesis of 1-MeAde in the ovarian follicle cells, (3) the isolation and identification of the 1-MeAde receptor located on the oocyte surface, (4) the characterization and function of MPF, and (5) fertilization in echinoderms: the role of divalent cations and jelly substances in the acrosome reaction.
In addition, the endocrine control of oocyte vitellogenesis and maturation in teleosts is under investigation. Particular attention has been given to (1) the purification of teleost gonadotropins, (2) the mechanism of gonadotropin action, (3) the identification of teleost MIS, and (4) the role of the different ovarian follicle layers in the production of estrogens and MIS.

Division of Cell Differentiation

Professor : Yoshiaki Suzuki
Associate Professor : Susumu Hirose
Research Associate : Masaaki Tsuda
Yoshihide Tsujimoto

The division conducts a research on the molecular basis of cellular differentiation with a special emphasis on regulatory mechanisms of tissue-specific genes. The major targets are fibroin and sericin genes which are expressed at specific stages of development in the posterior and middle portions of silk glands of the silkworm *Bombyx mori*, respectively. Employing the gene manipulation technology the members do "*in vitro* genetics"; isolation of the target wild-type genes, preparation of desired mutant genes from the wild-type genes, and *in vivo* and/or *in vitro* tests of biological functions for the wild-type and mutant genes. They ultimately hope to understand the regulation machinery of the tissue-specific genes through a reconstructed system which reflects the states of *in vivo* regulation. For the study of *in vivo* tests of biological functions, improvements of the introduction of foreign DNAs into living cells are being pursued. They have succeeded in establishing a cell-free transcription system prepared from the silk gland cells. Use of this system has revealed the promoter signal and the transcription enhancement signals of the fibroin gene.

Division of Morphogenesis

Professor : Goro Eguchi
Research Associate : Ryuji Kodama
Kiyokazu Agata

Mechanisms of differentiation and morphogenesis in multicellular organization have been investigated at cellular and molecular levels. The research has been currently focused on the following three projects. (1) The cell culture experimental system of chick embryo pigment epithelial cells (PECs) has been established. This system can produce a multipotential dedifferentiated state of PECs, which is able to redifferentiate to lens cells or pigment cells. By this system environmental factors controlling the transdifferentiation have been analyzed, particularly focussing on the structural and functional changes of cell surface relating to dedifferentiation and redifferentiation of the PEC. The molecular mechanism of specific gene expression has also been analyzed in the same system. (2) The mechanisms of pattern formation and stabilization of two dimensional epithelial tissue structures have been investigated in vivo as well as in vitro experimental systems by computer graphics, electron microscopy, micromanipulation and biochemical techniques. Such approaches

DATA TO DETERMINE THE PROMOTER REGION OF THE SILK FIBROIN GENE.

have also been extended to analyze morphogenesis of three dimensional tissue structures. (3) In addition to these two projects, analysis of cell lineage in early mammalian development has been conducted by means of whole embryo culture technique, which allows a fertilized mouse egg to develop into the somite stages.

Division of Developmental Biology (Adjunct)

DEPARTMENT OF REGULATION BIOLOGY

Chairman : Yoshihiko Fujita (acting)

The department has two divisions and two adjunct divisions and conducts research on the information processing and control mechanisms in biological systems.

Division of Sensory Processing

Professor : Ken-ichi Naka
Associate Professor : Syozo Yasui
Research Associate : Hiroko Sakai
Eiki Hida

The division conducts research on the information processing in the visual system through an interdisciplinary approach which includes traditional morphology and physiology, as well as nonlinear (white-noise) analysis and modelling. The main thrust of research is the functional morphology of the retinal of channel catfish, *Ictalurus punctatus*, and identification of spatio-temporal filtering characteristics of retinal neurons and neuron chains. The 16-year old research was originated at the Calif. Inst. Tech. and carried out at Univ. Texas Medical Branch at Galveston before it was moved to this new institute. The division is also planning to apply the methodology developed in channel catfish to study changes in the functional morphology of developing retinas.

Division of Chronobiology

Associate Professor : Hideaki Nakashima
Research Associate : Takao Kondo

The division aims to clarify the molecular structure and physiological function of the endogenous circadian rhythms (biological clocks). At the moment, the genetic and biochemical analyses of the *Neurospora* clock which controls the conidiation rhythm and physiological and biochemical studies of the duckweed (*Lemna gibba* and *L. paucicostata*) clock as related with the potassium uptake rhythm are the two major themes of research.

Division of Biological Regulation (Adjunct)

Professor : Masaki Furuya
Associate Professor : Yasuhiro Miyoshi (~Mar. 1984)
Katsushi Manabe (Apr. 1984~)
Research Associate : Kotaro Yamamoto
Satoru Tokutomi

The research in this division aims to study the regulatory mechanisms of biological functions at molecular and subcellular levels. The research programs proposed and being carried out at present center around the early changes

induced by environmental stimuli: first, physical and chemical characterization of phytochrome, a photoreversible chromoprotein that mediates plant development; second, the primary action of photoreceptors regulating functions of biological membranes; third, identification of chemically unknown pigments such as the blue and near-ultraviolet light absorbing pigment that control several photobiological processes, a green light absorbing pigment controlling phototaxis, and others which have been, and will be indicated in the results obtained with the LARGE SPECTROGRAPH here.

Division of Behaviour and Neurobiology (Adjunct)

Professor : Keiichi Mimura
Associate Professor : Tateo Shimozawa
Research Associate : Teiichi Tanimura

The division conducts research on the invertebrate behaviour through neurobiological approach which includes electrophysiology, morphology, and behavioural and genetic analysis. The division attempts to progress our researches through the following three ways. First, insect vision, especially neuronal mechanisms of the fly visual system, are investigated by electrophysiological, morphological, biochemical and behavioral methods. The second project intends to reveal the molecular mechanisms of taste in the fruit fly, *Drospohila melanogaster*, employing genetic methods. The approach includes electrophysiological and biochemical analyses of various mutants in sugar responses. The neural mechanisms underlying feeding behaviour is also a subject for study. Third, neuronal networks responsible for the generation of motor programs — e.g. righting behaviour, stridulation, and locomotion of crickets are interested. Particularly, analysis of the mechanisms involved in the selective recruitment of motorneurons is intended by means of microelectrodes, intracellular dye tracers and electron microscopy.

TECHNICAL DEPARTMENT

Chief : Hachiro Honda

The Technical Department is a supporting organization for researchers and research organizations within the NIBB. The department develops and promotes the institute's research activities and, at the same time, maintains the research functions of the institute.
The Department is organized into two groups: one, the Common Facility group, which supports and maintains the institute's common research facilities and the other, the Research Support group, which assists the intramural research activities.

Technicians participate, through the department, in promoting their capability through mutual enlightenment and education so that their capability in technical area develops.

Manager : Hachiro Honda
Staff :
Common Facility Group
Laboratory Computer Facility:
Yuichiro Ando
Large-Scale Spectrograph Laboratory:
Mamoru Kubota
Experimental Farm:
Chieko Nanba
Radioisotope Facility:

Kazuhiko Furukawa
Yukie Shinohara

Center for Analytical Instruments:
Hiroyuki Hattori (Chief)
Hiroko Kajiura
Hisashi Kojima

Glassware Cleaning Facility:
Toshiki Ohkawa

Research Support Group

Department of Cell Biology:
Akio Murakami
Soichi Nakamura

Department of Developmental Biology:
Satoko Adachi
Shinji Adachi
Hisayo Kondo
Shigeharu Takiya

Department of Regulation Biology:
Yohko Fujimura
Soh Hidaka
Masahiro Nasu

RESEARCH RESOURCE

There are four categories of research support facilities available to the intramural as well as to the visiting biological scientists: 1) Campus-wide facilities (CENTRAL COMPUTING CENTER and LIBRARY), 2) NIBB's own research support facilities (RESEARCH SUPPORT FACILITY, intramural), 3) facilities jointly maintained by the NIPS and the NIBB but managed either by the NIPS (ANIMAL-CARE FACILITY) or by the NIBB (RADIOISOTOPE FACILITY), 4) facilities jointly run by NIPS and NIBB (CENTER FOR ANALYTICAL INSTRUMENTS, ELECTRON MICROSCOPE CENTER, GLASSWARE CLEANING FACILITY, MACHINE SHOP and LOW-TEMPERATURE FACILITY).

RESEARCH SUPPORT FACILITY (INTRAMURAL)

Head of Facility : Ken-ichi Naka
Faculty : Masakatsu Watanabe (Spectrograph)
Yoshio Hamada (Tissue and Cell Culture)

The facility maintains large-scale experimental equipment and facilities for growing and maintaining biological specimens. The facility is shared by the intramural members and have six laboratories.

The Large-Scale Spectrograph Laboratory: This laboratory has the largest spectrograph in the world custom-built by Naka works, Hitachi Ltd. The spectrograph runs on a 30 KW-Xenon arc lamp and has a compound grating-surface composed of 36 smaller individual grating. A computer controls the positioning and time-scheduled light exposures of 12 specimen boxes.

Tissue and Cell Culture Laboratory: This is a facility for tissue and cell culture. This laboratory is equipped with safety rooms which satisfy the P3 physical containment level. This facility is routinely used for DNA recombination experiments.

Laboratory Computer Facility: The NIBB's computing is handled by a Digital Equipment Corporation's VAX-11/780 computer with a Floating Point System AP120B array processor and a Spatial Data image digitizer. An extensive software system for time-series analysis is available as well as a limited number of image processing routines.

Plant Culture Facility: There are a large number of culture

boxes and cubicles and a limited number of rooms with environmental control for plant culture.

Experimental Farm: This facility consists of 2 20 sq.m. glass-houses with precision temperature and humidity control, a limited farm, a large (88-sq.m.) and a small (45-sq.m.) green house with automatic sprinklers and window control, two (30- and 50-ton) open aquariums and several smaller tanks. The facility also includes a building with office, storage and work-space.

Plant Cell Culture Facility: Autotrophic and heterotrophic culture devices are equipped for experimental cultures of plant and microbial cells.

RESEARCH FACILITIES

RADIOISOTOPE FACILITIES (managed by NIBB)

Head of Facility : Yoshiaki Suzuki
Faculty : Kohji Hasunuma

The facility is composed of a center and two subcenters, one in NIBB and other in NIPS. The facility is being used for molecular analyses of eukaryotes. At the center a variety of radioisotopes such as ^{22}Na, ^{125}I, ^{32}P, ^{3}H and ^{14}C are handled as well as various species of gamma-ray emitting nucleides. A P3-level laboratory for recombinant DNA research is included in the center facilities. At the substations, only a limited variety of radioisotopes such as ^{3}H, ^{14}C and ^{32}P are processed. The substation in NIBB is equipped with a P2-level recombinant DNA research laboratory. The members of the Radioisotope Facility maintain and control the centers, and give users an appropriate guidance for radioisotope handling. The facility members conduct also their own research on the analysis of mutants in the metabolism of cyclic nucleotides in *Neurospora crassa*. The mutants exhibit several characters such as rhythmic conidiation, sensitivity to light, lack in the production of proteoperithecia and abnormality in meiosis. The goal of the research is to isolate and characterize the genes for the regulation of cyclic nucleotides with DNA recombination techniques.

ANIMAL-CARE FACILITIES (managed by NIPS)

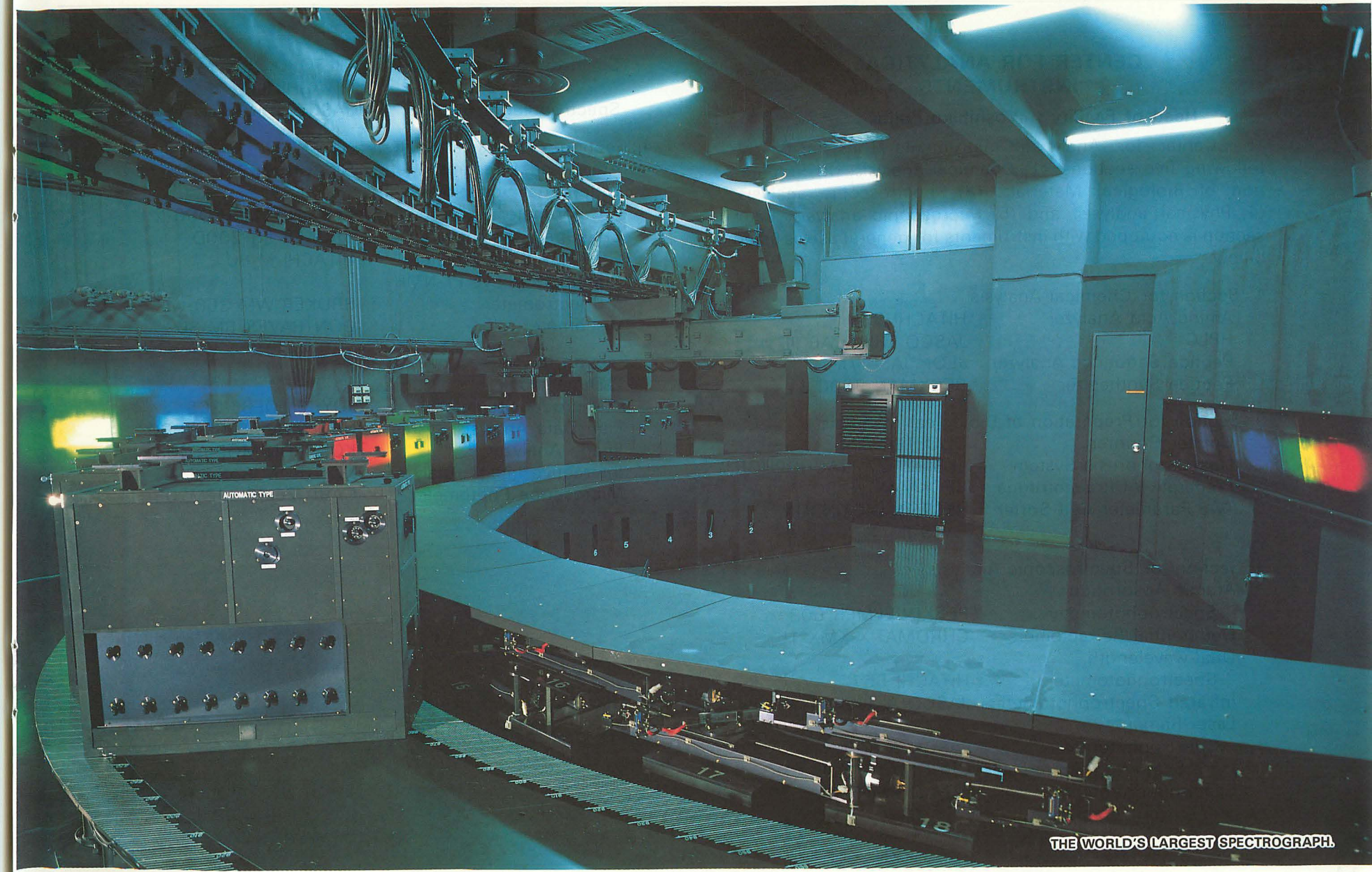
Vivarium: This is a 2,000-sq.m. building for (admitting and maintaining) land animals, including insects. Operations and experiments of a limited scope may be performed in the vivarium.

Aquarium: This is a 600-sq.m. facility for both fresh- and sea-water animals. There are 10 ten-ton and 31 0.5-ton tanks in addition to one seven-ton and one two-ton circular tanks. All tanks are individually temperature controlled and are supplied either with deionized water or seawater. There is a lorry with a one-ton temperature-controlled tank to transport aquatic animals and plant.

RESEARCH FACILITIES RUN JOINTLY WITH THE NIPS

ELECTRON MICROSCOPE CENTER

This facility maintains the following microscopes for the use of intramural members as well as researchers from other universities and research institutions.
Transmission microscope: Hitachi H-500 125KV, JOEL 100-CX and 200-CX 100 and 200KV, and Philips EM-400HM 120KV.
Transmission scope, analytical: JOEL 200-CX, 200KV.
Scanning scope: Hitachi S-450 25KV.



THE WORLD'S LARGEST SPECTROGRAPH.

CENTER FOR ANALYTICAL INSTRUMENTS

Head of Facility : Yoshihiko Fujita

The Center for Analytical Instruments consists of the following five sections. (1) Chemical analysis, (2) Preparation of Biological Materials, (3) Spectroscopic analysis, (4) Physical analysis, and (5) Microscopic analysis. Each section is equipped with instruments for general use as listed below.

1. Section for Chemical Analysis

Amino Acid Analyzer	HITACHI 835
HPLC	JASCO TRIROTAR III
Peptide Sequence Analyzer	JEOL JAS-47K
Peptide Synthesizer	BECKMAN 990C

2. Section for Preparation of Biological Materials

Coulter Counter	COULTER ZB
Isotachophoresis System	LKB 2127 TACHOPHOR
Preparative Ultracentrifuge	BECKMAN L8-80
Two Parameter Cell Sorter	BECTON-DICKINSON FACS-II

3. Section for Spectroscopic Analysis

Atomic Absorption Spectrophotometer	PERKIN-ELMER 603
Defferential Refractometer	CHROMATIX KMX-16
Dual-wavelength, Spectrophotometer	HITACHI 557
Infrared Spectrophotometer	JASCO A-302
Laser-Raman Spectrophotometer	JASCO R-800
Light Scattering Photometer	CHROMATIX KMX-6DC
Spectrofluorometer	HITACHI MPF-4
Spectrophotometer	GILFORD 250 HITACHI 330
Spectropolarimeter	JASCO J-40S

4. Section for Physical Analysis

Analytical Ultracentrifuge	HITACHI 282
Differential Scanning Calorimeter	PERKIN-ELMER DSC-2
EPR Spectrometer	BRUKER ER 200D
GC Mass Spectrometer	HITACHI M-80
Superconductive FT-NMR Spectrometer	BRUKER WM 360 wb
Viscometer	CONTRAVES RM-30

5. Section for Microscopic Analysis

2-Dimension Microdensitometer	JOYCE LOEBL 3CS
Film Data Analysis System	NAC MOVIAS GP-2000
Image Analyzer	KONTRON MOP-AM03
Interactive Image Analyzer	KONTRON IBAS-I.II
Microscope Photometer	CARL ZEISS MPM 03-FL

COOPERATIVE RESEARCH ACTIVITIES

The NIBB sponsors four cooperative research activities.

Individual and group cooperative research program: Scientists from other Japanese universities and research institutes are invited to undertake joint research projects with the intramural members. Limited funds are available for travel and expenditures related to the projects.

Research conferences: The NIBB sponsors research conference on important subjects in biology. Ten to twenty scientists are invited and intense discussion is held for two to three days. The NIBB provides financial support for the participants. Conferences may be initiated by scientists with other institutes or by intramural members.

Facility-sharing program: Scientists with other universities are entitled to the use of specified instruments maintained by the NIBB. No financial support is available except for the Large Scale Spectrograph whose user is provided with limited financial support.

Graduate student programs: Graduate students with other universities may spend a fixed period of time with members of NIBB. This allows students to have experience with the very modern facility of NIBB. The NIBB, however, does not have its own graduate program.

LIBRARY

The three institutes of the Okazaki National Research Institutes share a common library facility. The library is a part of the main administration building and has a floor space of about 2,478 sq.m.

The library has a stock of 9,350 books in Japanese and 30,050 in foreign languages and subscribes to 237 Japanese and 446 foreign journals. Lending records, inventory, and literature searches are computerized. The library is open 24 hrs every day.

LODGING FACILITY

The Okazaki National Research Institutes maintain two lodging facilities, one Mishima Lodge and the other Yamate Lodge. Mishima Lodge is a few minute walk away; Yamate Lodge is less than 20 minutes. The lodges are for scientists and their families staying for fixed periods of time with the institutes. Some suites and bungalows are provided with kitchenette facilities. A modest charge is levied to help to maintain the facilities.

Mishima Lodge has 27 single rooms, 3 suites and 6 bungalows for large families. Yamate Lodge has 11 single rooms, 4 suites and 2 family complexes.

On the campus there is a dining facility which is open Monday through Saturday.

THE CITY

The city of Okazaki, incorporated in 1916, is located 30 kilometers southwest of Nagoya, the fourth largest city in Japan. A high-speed urban train connects the two cities.

Okazaki, with a population of 275,000, is a typical medium-size city in Japan and offers the convenience of urban life while avoiding the disadvantages of a large city. Okazaki is the commercial as well as cultural center of the Mikawa (Three River) district with its rich historical heritage. Iyeyasu Tokugawa, the first Tokugawa Shogun, was born here in 1542 and built a castle here. The original parapets and moats and the rebuilt castle still dominate the city as they did 500 years ago. When he established the Shogunate in Edo (the former name of Tokyo) in 1603, Iyeyasu took a large contingent of Mikawa Bushi (Mikawa Samurai or professional warriors) with him. Those Mikawa Bushi formed the nucleus of Iyeyasu's new administration.

Within a radius of 10 kilometers from the city center are located Mitsubishi Motor's Okazaki Plant, Toyota Motor's main production facilities in Toyota City, and Sony's ultra-modern Koda plant which produces video tape recorders.

TRANSPORTATION

BY TRAIN

From Tokyo to Toyo-hashi: Two and half hrs by the Japan National Railway's (JNR) super train (KODAMA or ECHO). The train runs every 30 min.
From Toyo-hashi to Okazaki: Twenty five minutes by the Mei-tetsu (Nagoya Railway) express. Mei-tetsu's station in Okazaki is Higashi (or East)—Okazaki. The train runs every 20 to 30 min. This is the most convenient route to come to Okazaki from Tokyo.

From Tokyo to Nagoya: Two hrs by the JNR's super train (HIKARI or LIGHTENING). The train runs every 30 min.
From Kyoto/Osaka to Nagoya: One to two hrs by the JNR's super train (HIKARI/KODAMA). Kin-tetsu (Kinki Nippon Railway) also serves between Osaka/Nara and Nagoya.
From Nagoya to Okazaki: Thirty five minutes by the Mei-tetsu express which runs every 20 min. Mei-tetsu's station in Okazaki is Higashi (or East)—Okazaki.

BY AIR

Domestic airlines serve Komaki, Nagoya, airport which is 1 hr. drive from Okazaki.

WEATEHR

In Okazaki, temperature goes up to 30 degree centigrade in the summer and down to a few degrees above the freezing point in the winter. May to June is the rainy season and the spring (March to May) and fall (September to November) are most pleasant.

THE OKAZAKI CASTLE,
THE HOME OF THE FIRST
TOKUGAWA SHOGUN, IYEYASU.

DIRECTOR GENERAL

TOKINDO S. OKADA, B. Sci. & D. Sci. (zoology, Kyoto Univ.), Research Associate, Dept. of Zoology, Kyoto Univ. (1954—59), Macaulley Fellow, Univ. Edinburgh (1957—59), Lecturer, Dept. of Zoology, Kyoto Univ. (1960—61), Associate Professor, Dept. of Zoology, Kyoto Univ. (1962—66), Carnegie Fellow, Dept. of Embryology, Carnegie Institution of Washington (1964—65), Professor, Dept. of Biophysics, Kyoto Univ. (1967—), Director General, NIBB (1984—).

PROFESSORS

GORO EGUCHI, Division of Morphogenesis. B. Sci. & D. Sci. (biology, Nagoya Univ.), Research Associate, Department of Biology, Nagoya Univ. (1959—68), Associate Professor, Department of Biophysics, Kyoto Univ. (1968—76), Professor, Institute for Molecular Biology, Nagoya Univ. (1976—84), Professor, NIBB (1983—)

YOSHIHIKO FUJITA, Division of Bioenergetics. B.L.A. (liberal arts, Univ. Tokyo), M. Sc. (biology, Univ. Tokyo), D. Sc. (biochemistry, Univ. Tokyo), Research Associate, Inst. Appl. Microbiol., Univ. Tokyo (1957—67), Postdoctral Fellow, Univ. Texas (1962—64), Research Associate, Univ. Texas (1965), Associate Professor, Ocean Res. Inst., Univ. Tokyo (1967—77), Professor, Ocean Res. Inst., Univ. Tokyo (1977—1982), Professor, NIBB (1979—), Acting Director, NIBB (Feb.—Sept., 1984).

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