RIKEN has consistently maintained this objective throughout its transitions from public corporation to independent administrative institution, and now, national research and development institute. RIKEN is the only national organization charged with conducting comprehensive research in all areas of science and technology rather than just one specific field. What should RIKEN do to carry out its mission? Our present answer is to flexibly implement the following three strategies for improving science and technology.

The first is a strategy for “strategic centers” to promote the government’s millennium projects, ongoing since the start of the 2000s, to achieve cutting-edge outcomes through subject-oriented research.

The second strategy is for “infrastructure centers” to provide a wide range of supports not only to researchers in academia but also to those in the private sector, with large-scale facilities and equipment such as supercomputers and the SPring-8 synchrotron facility, as well as bioresources. In this regard, the RIKEN BioResource Research Center (BRC) has long served as one of RIKEN’s core infrastructure centers.

Finally, precisely because RIKEN is not limited to any specific one research field, our third strategy is to pioneer new research fields. One approach has been to create a Pioneering Research Cluster that represents a modern adaptation of the Chief Scientist system to foster free thinking and innovative ideas initiated by RIKEN’s third President Masatoshi Okochi.

In addition to these three strategies, RIKEN is actively engaged in “co-creation” and “collaboration” activities with domestic universities, industry, and research institutes for the purpose of finding solutions for global issues and implementing them in society. RIKEN plays a major role as a hub for science and technology innovation. Dr. Kotaro Honda, a former RIKEN Chief Scientist, once said “Industry is the practice field of learning,” but improving the standard of science and technology cannot be achieved solely by publishing scientific papers. RIKEN’s objective is to work for “science in society and science for society” in cooperation with industry and local communities. With this in mind, RIKEN BRC is working to expand its activities with a satellite facility in Keihanna Science City.

RIKEN’s management policies are outlined in the RIKEN Initiative for Scientific Excellence and form the key pillars of RIKEN’s fourth mid-to-long-term plan. We greatly appreciate your understanding of our various activities and ask for your continued guidance and support as we strive to achieve our mutual goal of growth and achievement.

RIKEN Initiative to Generate World-class Results

1. Pioneer a research management model for maximizing research and development results
2. Lead the world in achieving new research and development results through scientific excellence
3. Become a hub for science and technology innovation
4. Serve as a focal point for global brain circulation
5. Foster the development of world-class leaders in scientific research

At present, numerous new bioresources are being developed in a wide range of fields of the life science, with the advances in genome science and the emergence of innovative genome editing technologies. These are experimental animal models for senescence and rare or intractable diseases in humans, cell lines containing pluripotent stem cells such as disease-specific iPSC cells, plants and microorganisms that are indispensable for increasing food production and for solving environmental problems and health/medical care. They also include genetic (DNA) materials derived from the aforementioned bioresources. There is also a growing need for bioresources with multiple gene mutations in addition to single gene mutation. Under such circumstances, we anticipate that secondary bioresources newly developed by research community using resources provided by the bioresource centers will increase in the future.

Therefore, we think that the important mission of the bioresource centers is to drive the circulation of bioresources between the bioresource centers and the research community to stimulate the life science and innovation. RIKEN BRC will strive to continue contributing to promotion of the life science and industry by collection and dissemination of the cutting-edge resources newly developed by the research community.

RIKEN’s fourth mid-to-long-term plan, which started in April 2018, has entered its third year since April 2020. In 2019, RIKEN BRC received invaluable advice and recommendations from the Domestic Resource Committees, the Domestic Trust Review Committees, the International Advisory Council of RIKEN BRC, and finally RIKEN Advisory Council. RIKEN BRC will incorporate these valuable advice and recommendations into our operation. In April 2020, Dr. Yoshihiro Miwa was appointed as Head of Gene Engineering Division. With the new colleague, RIKEN BRC will work to further upgrade the world’s top-level bioresource infrastructure with three mottos, “trust,” “sustainability,” and “leadership.” We look forward to your continuous support for our operation.
The Fourth Mid- to Long-Term Plan of RIKEN BRC

Collect, preserve and provide bioresources of the world first class with regard to usability, associated information and quality by grasping social and research needs (I), develop basic technologies for preservation and usage of bioresources (II), conduct research and development that promote active use of our bioresources (III). By all these activities, we aim to contribute to the effective and efficient promotion of cutting-edge research and innovation and to solution of social problems.

I. Bioresource Infrastructure

- **Experimental Animal (mouse)**: Animal models for understanding of sophisticated life phenomena, promoting human health and conquering diseases
- **Genome-edited KO and KI mice**
- **Mouse Cloning Using a Drop of Peripheral Blood**
- **Mouse Phenotype Analysis**
- **iPSC-based Drug Discovery (Keihanna)**
- **iPS Cell Advanced Characterization**
- **Next Generation Human Disease Model**
- **Plant-Microbe Symbiosis**

II. Key Technology Development

- **Mammalian Genome Dynamics**
- **Mouse Phenotype Analysis**
- **iPSC-based Drug Discovery (Keihanna)**
- **iPS Cell Advanced Characterization**
- **Next Generation Human Disease Model**
- **Plant-Microbe Symbiosis**

III. Bioresource Frontier Program

- **Mammalian Genome Dynamics**
- **Mouse Phenotype Analysis**
- **iPSC-based Drug Discovery (Keihanna)**
- **iPS Cell Advanced Characterization**
- **Next Generation Human Disease Model**
- **Plant-Microbe Symbiosis**

Mission

Providing bioresources to life science researchers worldwide

Environmental Issues

R&D for bioenergy production
Global warming and biodiversity

Food Production

Nutritional crops
Nutrition rich crops and vegetables

Infectious Diseases - Immunology

Emerging and reemerging pathogens
Allergy and autoimmunity

Brain Science

Holistic understanding of cognition, memory, learning, health, and diseases

Basic and Fundamental Research

Essential materials supporting all fields of life science

Cancer Research

Advanced and novel methods for diagnostic, treatment and prevention

Regenerative Medicine

Stem cell biology
Novel cell therapy

Innovative Drug Development

Elicitation of disease mechanism
Discovery based organism information

Global Network of Bioresources

- Varieties and quantity of bioresources produced and needed have been increasing dramatically and already exceeded the capacity of a single biological resource center or even single country.
- Global standardization or harmonization of quality of bioresources is needed.
- Need for Global Network of Bioresources

General

Asian Network of Research Resource Centers (ANRRC)

Mouse

International Mouse Phenotyping Consortium (IMPC)

Human and Animal Cells

International Stem Cell Bank Initiative (ISCB)

Plant

Multinational Arabidopsis Steering Committee (MASC)

Microbes

World Federation for Culture Collections (WFCC)
For basic researches to study our health and diseases

Mouse
We collect, preserve and distribute high-quality mouse resources useful for basic researches to contribute our health.

We develop novel mouse resources and technologies for preservation, distribution and quality control.

We offer training courses for advanced technologies for best use mouse resources.
(Experimental Animal Division and Bioresource Engineering Division)

Arabidopsis
Dicot model plant
We distribute mutant Arabidopsis resources that are useful for functional genomics.
(Experimental Plant Division)

Brachypodium
Monocot model plant
We distribute resources and technologies of Brachypodium that help crop breeding research.
Cell

The cell engineering division is providing a high quality cell lines free of mycoplasma infection and misidentification. In order to contribute not only to basic sciences but also to applied sciences, we are providing various cell materials such as human cancer cell lines, ES cells, iPS cells, and human somatic stem cells.

In addition, we are also offering training courses for the technologies relating to cell culture.

(Cell Engineering Division)

Gene

We aim to facilitate life science research for improvement of human welfare and for solution of environmental issues and hope to contribute to the sustainable development of science.

Genetic materials are the most fundamental and essential research tools. They are used in all fields of the life science, from basic to applied researches.

The time has come to order genetic materials instead of cloning by yourself. You can easily find genes of your needs by on-line search in our web site.

(Gene Engineering Division)
Microbe

We are contributing to a wide range of researches from basic to innovation by collecting and providing diverse authentic type strains and their related strains of microorganisms.

We hold a number of microbial strains useful for researches for solution of environmental issues such as production of bioenergy, development of biodegradable plastics, and bioremediation.

These are also strains that are beneficial for health science such as improvements of enteric condition and immunological competence, antibiotic production, and fermented food.

(Microbe Division/Japan Collection of Microorganisms)

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We hold a number of microbial strains useful for researches for solution of environmental issues such as production of bioenergy, development of biodegradable plastics, and bioremediation.

These are also strains that are beneficial for health science such as improvements of enteric condition and immunological competence, antibiotic production, and fermented food.

(Microbe Division/Japan Collection of Microorganisms)
Support Unit for Quality Management

Uniform international quality standard : ISO 9001

- QMS (Quality Management System) in order for BRC to achieve total customer satisfaction and to deliver the highest value biological resources and services on time.
- Endeavor to deliver the biological resources of reliable quality.
- Maintenance of ISO 9001 certification to deliver the biological resources of reliable quality, and horizontal development of ISO management system framework.
- Endeavor for customer satisfaction, human resource development and continual improvement, based upon Total Quality Management (TQM) which has made Japanese manufacturing industry very strong.
- Realization and standardization of high-quality, speedy and simple job process, by means of the data digitization making use of the latest Information Communication Technology (ICT).

Bioresource Engineering Division

- Nuclear transfer cloning: Establishment of an efficient technique for production of cloned mice. A great leap to the practical use of cloning technology in mammals.
- Microinsemination (sperm injection): Production of normal mice using not only normal mature spermatozoa, but also immature spermatids and spermatozoa retrieved from frozen mouse bodies.
- Cryopreservation of embryos and germ cells and their transportation: Development of embryo cryopreservation techniques applicable to a variety of mouse strains. Safe transportation of vitrified embryos in dry ice packages to avoid the use of dry shippers.
- Establishment of new stem cell lines: Mouse ES cells with different characters and different origins. Rabbit ES cells and iPS cells with potential usefulness as new experimental models.
- Technical training courses: Cryopreservation of mouse sperm and embryos, and establishment and maintenance of mouse embryonic stem cells.

Technology and Development Team for Mammalian Genome Dynamics

- Technology development for functional genomic analysis: methods for high resolution genotyping and genome manipulation utilizing high quality BAC genomic resources.
- Technology development for characterization of embryo-derived stem cells and germ cells; analysis of molecular and epigenetic features of these cell types using novel imaging techniques and genomic analyses at single-cell level.
- Technology development for bioimaging: analysis of cellular behaviors and functions in vivo utilizing an intravital microscope equipped with novel stick-type lenses.

Technology and Development Team for Mouse Phenotype Analysis

- Systematic and comprehensive phenotypic analyses for genetically-modified mice based on the fundamental and in-depth pipelines in the Japan Mouse Clinic.
- Contribution to international mouse phenotyping project through the participation to International Mouse Phenotyping Consortium (IMPC).
- Intellectual infrastructure for the mouse resource through the integration of mouse phenotype information with the related clinical data on human diseases.
- Development of new phenotyping methods to analyze mouse resources.

Japan Mouse Clinic

- Contribution to building a sustainable solution for world food and environmental problems through construction of bioresources and experimental systems of experimental plants and rhizosphere microbes for the symbiosis studies.
- Contribution to building a sustainable solution for world food and environmental problems through collaborative researches with domestic and international research communities.

Plant-Microbe Symbiosis Research and Development Team

- Elucidation of the symbiosis between plants and rhizosphere microbes including mycorrhiza fungi.
- Construction of bioresources and experimental systems of experimental plants and rhizosphere microbes for the symbiosis studies.
- Contribution to building a sustainable solution for world food and environmental problems through collaborative researches with domestic and international research communities.

IPS Cell Advanced Characterization and Development Team

- Advanced characterization (e.g., pluripotency and genome) of disease-specific iPS cells deposited in RIKEN cell bank.
- Development of modified (e.g., mutation-corrected, mutation-introduced, and reporter-introduced) iPS cells using genome-editing technologies.
- Development of differentiation system and disease models using disease-specific iPS cells deposited in RIKEN cell bank.

Next Generation Human Disease Model Team

- Development of mouse models faithfully recapitulating genomic mutations and pathology of designated intractable diseases or diseases of the aged based on the patients’ genome information by the genome modification technology.
- Analyses and evaluation of the mouse models through the standard, disease-specific and ageing-specific phenotyping platforms of the international standard.
- Establishment of POC in preclinical studies by investigating disease mechanisms and pharmacokinetics in collaboration with experts.
- Provision of disease models with useful information for diagnosis, therapies and drug discovery to biomedical research community.

IPS Cell Research Unit for Drug Discovery (RIKEN DMP)

- This unit belongs to RIKEN Program for Drug Discovery and Medical Technology Platforms (RIKEN DMP).
- Basic researches using disease-specific iPS cells to identify the causal and/or associated cells of each disease.
- Development of methods to screen chemicals for drug discovery with the causal and/or associated cells derived from disease-specific iPS cells.
- Refinement of technologies to induce the causal and/or associated cells efficiently from disease-specific iPS cells, and the mass production of such cells for chemical screening.

Shinozaki Research Collaborative Group

- Construction of research infrastructure for the promotion of biomass engineering based on a model biomass plant Brachypodium.
- Contribution to advanced bioresources on the collection of full-length cDNA and phenotype analysis of gene knock-out mutants in Arabidopsis.
- Discovery of useful genes for the application to molecular breeding of drought tolerant rice, wheat and soybean.
History

1917 March RIKEN Foundation established.
1948 March RIKEN Foundation dissolved and replaced by KAKEN (Kagaku Kenkyusho) Corporation
1958 October RIKEN Act enforced.
1974 May Life Science Promotion Division set up to undertake life science projects.
1984 October Tsukuba Life Science Center founded.
1987 May Gene Bank began operation.
2000 April Tsukuba Life Science Center renamed Tsukuba Institute.
2003 October RIKEN reorganised as Independent Administrative Institution.
2004 July The Japan Collection of Microorganisms (JCM) in Discovery Research Institute in the Wako Institute was integrated with the BioResource Center.
2008 April The RIKEN Genomic Sciences Center was merged to the BioResource Center.
2011 January RIKEN BRC 10th Anniversary
2012 May JCM moved to Tsukuba campus.
2013 April The third term as an independent administrative institution.
2015 April “Tsukuba Institute” renamed “Tsukuba Branch”
2016 October RIKEN reorganised as National Research and Development Institute
2017 March RIKEN 100th Anniversary
2018 April “BioResource Center” renamed “BioResource Research Center”

Budget (FY2019)

- BioResource Center ・ Tsukuba Branch
- Government subsidy/Operating expenses grant – 2.82 billion yen
- Competitive external funds – 0.45 billion yen

Personnel (April, 2020)

- Developmental Research Staffs: 371
- Permanent Researchers: 20
- Indefinite-term Employee: 13
- Contract Research Staffs: 44
- Technical Staffs: 72
- International Program Associate: 1
- Junior Research Associate: 3
- Agency Staffs: 46
- Visiting Staffs: 50
- Senior Staffs and Research Fellows: 15
- Outsourcing, Part-timers: 107
- Administrative Employees & Tsukuba Safety Center Staff: 58
- Total: 429

Facilities

- RIKEN BioResource Research Center

Organization

- President of RIKEN
- Director (President, SHIROISHI, Ph.D.)
- Deputy Director
- Kunimasa KAMIMURA, Ph.D.
- Senior Adviser
- Yuji OKAZAKI, Ph.D.
- Coordinator
- Atsushi YOSHIKAWA, Ph.D. (concurrent)
- Kazuaki NAKAMURA, M.D., Ph.D.
- Office of the Center Director
- Advisory Council
- Resource Committees
- Review Committees
- <BioResource Infrastructure Divisions>
- Experimental Animal Division
- Experimental Plant Division
- <BioResource Engineering Division>
- Technology and Development Team for Mammalian Genome Dynamics
- Technology and Development Team for Mammalian Genomics
- IPS-based Drug Discovery and Development Team
- IPS C4A Advanced Characterization and Development Team
- Next Generation Human Disease Model Team
- Plant-Microbe Synergistic Research and Development Team
- IPS Cell Research Unit for Drug Discovery (RIKEN DPRI)
- <Research Collaborative Group>
- Laboratory Head: Kaise SHIKOKU, Ph.D.

- RIKEN BioResource Research Center
Activities of RIKEN BRC

Public Relations Activities

Public Relations Activities

- Our website provides useful information about resources, protocols, FAQs, etc.
- Monthly newsletters featuring “Resource of the Month” are distributed via email by the Divisions.
- Outreach activity using booths display and handouts at many scientific meetings.
- Display at Tsukuba Science Information Center “BiVi Tsukuba.”
- Annual open day for general public.
- Exhibition space on our premises for visitors.
- BRC facility tour to accept nearly 1,000 high school students in FY2019.
- A series of two-hour science lectures for adult citizens and offer hands-on learning opportunities at Tsukuba EXPO center.

Cooperation with among Asian Countries

- We attended the 8th RIKEN BRC/Nanjing University MARC/KMPC International Mouse Workshop (Japan-Sino-Korea Mouse Workshop) in Nanjing University MARC in summer 2019.
- We attended the 11th Asian Network of Research Resource Centers (ANRRC) International Meeting in Los Baños, Philippines in 2019.
- We provided opportunities for conducting research in RIKEN BRC to foreign researchers, students and interns from Netherlands, Sweden, Russia, Sri Lanka, Bangladesh, Malaysia, Indonesia, China and Korea in FY2019.
- RIKEN BRC concluded MoU with the Korean National Research Resource Center (KNRRC) and Institute of Microbiology Chinese Academy of Sciences (IM-CAS) in 2015.
- RIKEN BRC concluded Record of Discussion (RoD) with the Biodiversity-Based Development Office (BDDO) in Bangkok in FY2014.

Payment Courses: Advanced Technologies for the Best Use of Bioresources

Courses (FY2019)

- Mouse: Training course for genetically modified mouse generation using genome editing technology – TALEN method for mouseygase replacement – (Practical course)
- Plant: Technical training course for maintenance of plant cell cultures and transformation of Arabidopsis, 187 cells
- Plant: Technical training course for cryopreservation of tobacco BY-2 cells
- Plant: Technical training course for the grafting technique for Arabidopsis plants
- Cell: Course of basic technologies for cell culture. Course I & II
- Cell: Technical training on how to handle human embryonic stem cells
- Cell: Training course for human iPS cells
- Microbial Technical training on cryo-preservation and 18S rRNA gene sequence analysis
- Reproduction Engineering: Technical training course for ICSI (intracytoplasmic sperm injection) of mice

Participants

Universities: Hokkaido, Yamagata, Tokushima, Nagoya, Tsukuba, Kitami, Tokyo, Tokyo Med, Doshisha, Kochi, Toyama, Nagoya Univ., Tokyo, Kyushu, Osaka, Hiroshima, Tottori, Kyoto, Waseda, Keio, Meiji

Institutes: AST, NARO, NIES, NIB, Industries - Pharmaceutical, Food, Motor, Chemical, etc.

RIKEN's Programs for Junior Scientists

The International Program Associate (IPA) is a non-Japanese doctoral candidate attending a Japanese or overseas graduate school participating in RIKEN's joint graduate school program. The IPAs carry out research at RIKEN under the supervision of RIKEN scientists as part of their endeavor to obtain a PhD. Benefits include daily living expenses and a housing allowance. The Junior Research Associate (JRA) program provides part-time positions at RIKEN for young researchers enrolled in Japanese university graduate schools in a joint graduate school program. Remuneration includes salary and commuting allowance. The Special Postdoctoral Researchers (SPDR) is instilled to offer young and creative scientists the opportunity to be involved in autonomous and independent research that is in line with RIKEN objectives and research fields. RIKEN provides the SPDR with a salary and research budget.

Tsukenagic Global Innovation Promotion Agency

Tsukenagic Global Innovation Promotion Agency has been established for the purpose of becoming the new hub of leading academic innovations world-wide, as future suggested in "New Grand Design of Tsukuba," by taking advantage of research institutions’ integrity at "Tsukuba International Strategic Zone" to full extent, BRC was appointed as organizer. Master’s/Doctoral program in Life Science Innovation was established in University of Tsukuba by this agency. Five scientific of BRC were delegated as guest professors in the program. They give a mandatory course on bioresource science and advocate the importance of bioresource.

RIKEN BioResource Research Center