Since its establishment in January 2001, the RIKEN BioResource Center (RIKEN BRC) has been operating with three principles, “Trust,” “Sustainability,” and “Leadership.” We have gained recognition as one of the world’s leading centers for the repository of experimental mice, the model experimental plant Arabidopsis, cell lines of human and animal origin, genetic materials, and microorganisms. We sincerely thank the research community and Japanese citizens for the understanding and support they have given us. We will endeavor to develop our center further in the coming years.

In Japan’s Fourth Science & Technology Basic Plan, which was legislated in August 2001, “Innovation” was added to “Science” and “Technology” as an important goal to be pursued. In addition, following the Great East Japan Earthquake and Tsunami of March 11, 2011, “Reconstruction” was further added to the objectives. Today, humanity faces a host of problems on a global scale, involving the environment, energy, food, and infectious diseases. By pursuing solution-oriented science, technology, and innovation to address these problems, we can work toward achieving the sustainable existence and development of Japan and our people. We will develop our activities further with the desire to create new value through bioresources that can function as a foundation for science, technology, innovation, and recovery.

In 2010, a group of resource centers from the Asian region, which is gaining an increasingly prominent place in the world in a number of areas, established the Asian Network of Research Resource Centers (ANRRC), and there are now members from more than ten countries. We plan to continue to play a leadership role among Asian resource centers by being a leader in the network and by carrying out a wide range of activities in the preparation and use of bioresources, from the sharing of goals to the transfer of technology.

At present, global competition for the development and possession of bioresources is becoming increasingly severe. On the other hand, international cooperation is needed as there has been an explosive increase in the bioresources needed for research and development, making it impossible for any single country or center to maintain all necessary bioresources. As Japan’s core center, we will play an active role in various international collaborative efforts in this area.

Using our past experience to better understand research trends and to meet scientific needs quickly, flexibly, and with initiative, we will strive to become a center that is always deemed to be essential and which receives society’s support. Our center is built upon the support and requests of our users, and we hope that we may rely on your continuing support into the future.
Mouse

Collection, preservation and distribution of high-quality mouse resources useful for basic researches to contribute our health.

Development of novel mouse resources and technologies for preservation, distribution and quality control.

Provision of training courses for advanced technologies to best use mouse resources. (Experimental Animal Division and Bioresource Engineering Division)

Arabidopsis

We distribute mutant Arabidopsis resources that are useful for functional genomics.

We establish SABRE database that connects plant cDNA to Arabidopsis genes.

We maintain plant cultured cell lines that can be applied to both basic and applied researches. (Experimental Plant Division)
Cell

As a striking fact, approximately 30% of the deposited cell lines are infected with mycoplasma and nearly 10% of them are misidentified with other cell lines.

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, iPSCs, and human somatic stem cells.

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

(Gene 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 the all fields of the life science, from basic to applied researches.

Current trend is to search and find genetic materials by internet. A clone of desired gene can be easily retrieved via the web sites.

(Gene Engineering Division)
Microbe

We are contributing to a wide-variety of researches from basic to applied science by collecting and providing diverse authentic type strains and their derivatives of microorganisms.

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

We hold a number of strains isolated from human and its surrounding environments. These strains 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)

Experimental Animal Division

NBRP Mice

- Collection, preservation and distribution of high-quality mouse resources useful for basic researches to understand the gene functions and to cure human complex diseases.
- Development of novel mouse resources and relevant technologies for preservation, distribution and quality control.
- Provision of training courses to disseminate advanced technologies for the best use of frozen strains and quality control of mouse resources.

Experimental Plant Division

NBRP Arabidopsis, Cultured plant cells, genes

- Collection, preservation and distribution of various Arabidopsis resources that are indispensable for plant science.
- Maintenance and improvement of plant cultured cell lines and genetic materials for the studies on environment, food, and useful materials.
- Development and propagation of technologies and databases that promote effective use of biological materials.

Cell Engineering Division

NBRP Human and Animal Cells

- We are collecting and providing the following cells: cultured cell lines such as human cancer cells; stem cells such as ES cells, iPS cells and human somatic stem cells; the cells for human genome research.
- We accept donation and deposition of the cells that have been developed by life science community, carry out quality control of them, standardize them, and provide high quality cell materials to all scientists around the world.
- We offer training courses for the technologies relating to cell culture, so as to contribute to the development of new technology such as human ES cells and iPS cells.
**Gene Engineering Division**

The Gene Engineering Division conducts rigorous quality control on genetic materials and provides domestic and international scientific community with the materials of ensured reproducibility of experimental results. We aim to contribute to solution of problems in human health and environment.

- We distribute genes derived from human, animals and microorganisms as well as expression vectors for forced expression and reporter plasmids for monitoring gene expression. We have opened a path to the academic use of genetic materials produced by research tools owned by commercial entities.

- By comprehending newest trends and needs of life science, we collect and distribute genetic materials developed in the domestic and international scientific community as well as compiled products of National Projects.

- RIKEN BRC securely preserves bioresources and uses the Material Transfer Agreements (MTA) for each transfer of bioresources to protect the intellectual property rights of the developers of genetic materials and to define the responsibility of users.

**Support Unit for Quality Management**

Endeavor to deliver the biological resources of reliable quality

Uniform international quality standard: ISO 9001

We shall strive for excellence and take all possible measures to 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.

- 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).

**Microbe Division**

Preservation and provision of scientifically important microbial strains representing diverse species of Bacteria, Archaea, and Fungi.

- Collection of microbial bioresources that contribute to environmental and health science, enrichment of information of the strains in the database, addition of high values to them, and development of related technology.

- Provision of reliable high-quality microbial cultures by intensive quality control with genetic and physiological tests and stable preservations.

**Bioresource Information Division**

Collection, analysis, management of bioresource information and its dissemination to research communities through the web-based catalogs.

- Development and operation of tools for users to make BRC bioresources easy to use.

- Development and operation of distribution system necessary to execute the mission of BRC efficiently.

- 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, Establishment and maintenance of mouse embryonic stem cells).
● 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 embryonic-derived stem cells and germ cells: analysis of molecular features that characterize cell types in which "genomic reprogramming" take place utilizing novel visualization tools and micro-analytical methods.

● Technology development for bioimaging: analysis of cellular behaviors and functions in vivo utilizing an intravital microscope equipped with novel stick-type lenses.

● Study for the elucidation of the regulatory mechanisms of autoimmune and inflammation systems.

● Study for the elucidation of the regulatory systems of bone metabolism.

● Study for the elucidation of the regulatory mechanisms of hematopoiesis systems.

● Development of methods to expand hematopoietic stem cells in vitro.

● Development of methods for efficient generation and stable expansion of pluripotent stem cells (ES and iPS cells).

● Development of viral vectors to transfer genes into cells and their use in stem cell research.

● 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 IMPC (International Mouse Phenotyping Consortium).

● Intellectual infrastructure for the mouse resource through the integration of mouse phenotype information with the related clinical data on human diseases.

● Cutting-edge research technologies for metabolic syndrome models: advanced phenotype analyses using proteomic and metabolomic methodology to develop human metabolic syndrome models.

● Quest for cure of the physiological impairments: deafness model and hypertensive model development to better understand their molecular mechanisms.

● Informative models of human carcinogenesis: advanced comprehensive analyses to develop models for pre-symptomatic diagnosis and novel anti-cancer drug development.

● Base-substitution mice in your target gene: Originally developed open resource for mouse reverse genetics by random ENU mutagenesis.

● Next-generation sequencing of whole mouse exome: Discovery of unknown mutations and quick access for positional cloning.

● Next-generation gene targeting toward the modeling of epistatic interactions: No backcrosses to identify modifiers.
The RIKEN BRC is working closely with Research Collaborative Groups. In Research Collaborative Groups, there are 2 Groups: Ishii Research Collaborative Group and Shinozaki Research Collaborative Group.

**Ishii Research Collaborative Group**

Contribution to Bio-Resource project by generation and analysis of mutant mice of transcription factors Contribution to Bio-Resource project by analysis of reprogramming mechanism and by development of new technology of iPS cell generation Contribution to Bio-Resource project by analysis of gene expression network using various mutant mice.

**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.

**Bioresource Research Collaborative Group**

In order to contribute to the progress of the life sciences, we collect, develop, manage, analyse, store and supply experimental animals and plants, cell strains, genetic materials, microorganisms, and related information.

**Key Technology Development**

- In order to maintain, preserve, and use resources, we develop effective methods of nuclear transplantation, establish intra-cytoplasmic sperm injection, and improve cryopreservation and transportation technology for embryos and living cells, as well as other reproduction technologies.
- Establishment of BRAND Models for human diseases, and publish training courses in order to improve the use of bioresources.
- We carry out training courses in order to improve the use of bioresources.

As well as building a network with related organizations overseas, we also promote international collaboration and contribution by concluding Memorandums of Understanding with universities and institutes in abroad.

**Managing bioresources**

- We develop novel resources, improve value of resources, establish novel technologies for phenotype analysis of mouse models for human diseases, and publish information of our activities to research communities.

**Bioresource Frontier Programs**

- We develop novel resources, improve value of resources, establish novel technologies for phenotype analysis of mouse models for human diseases, and publish information of our activities to research communities.

**International cooperation**

- As well as building a network with related organizations overseas, we also promote international collaboration and contribution by concluding Memorandums of Understanding with universities and institutes in abroad.
Facilities

1. BioResource Center, Main Building
2. BioResource Building for Cell Research
3. Management Building
4. Informatics and JCM Building
5. Research Building (1st Phase)
6. Research Building (2nd Phase)
7. Recombinant DNA Experiment
8. High-Pressure Sterilizer Building
9. Heat Storage Tank
10. Research Building for Animal Models of Human Diseases
11. Analysis Laboratory
12. Energy Center
13. Sewage Treatment Area
14. Visitors Quarters
15. Cafeteria
16. Refreshing Quarters
17. Parking Structure
18. Guard Station
19. Special High Voltage Electrical Substation

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.
2011 January RIKEN BRC 10th Anniversary

Budget (FY2012)

BioResource Center
Government subsidy/Operating expenses grant: 2.9 billion yen

Comptitive external funds: 0.4 billion yen (FY2011)

Personnel (April, 2012)

- Developmental Research Staffs: 391
- Permanent Researchers: 33
- Contract Research Staffs: 52
- Technical Staffs: 82
- Special Postdoctoral Researchers: 4
- Junior Research Assistants: 1
- Agency Staffs: 75
- Visitors Staffs: 28
- Outsourcing, Part-timers: 116
- Administrative Employees & Tsukuba Safety Center Staffs: 43
- Total: 434
The RIKEN BRC as a station for dissemination of bioresources produced by RIKEN and Japanese scientists

Protection of Intellectual Property Rights of the Developers and Promotion of Science

- **IPR remains with the Developer**
- **Terms and Conditions of Use** (including for Commercial Use)
- **Material Transfer Agreement**
  - **MTA**: For Deposition
  - **MTA**: For Distribution

For Sustainable Use of Irreplaceable Bioresources

**Resources maintained by retiring researchers**

- Institute of Development, Aging and Cancer
  - All Human and Animal Cancer Cell Lines

- The University of Tokyo
  - Institute of Molecular and Cellular Biosciences
  - Former Institute of Applied Microbiology
  - IAM Culture Collection
  - 5,191 Microbe Strains

- Tohoku University
  - Institute of Development, Aging and Cancer
  - 4,000 Blood Specimens of Japanese and Mongoloids

**Bioresources from National Projects**

- Genome NickHack Projects
- Plasmo 3,000 Project
- DNA of Human, Animal, Microorganisms

**Deposit**

- RIKEN BRC
- MEXT

**Distribution**

- BRC
- MTA

**User's Fee**

- National Funding
- Public funding

**For National and International Scientific Community**

- Universities
- Institutes
- Industries
- Research Institutions
- Academia
- Communities
- International Collaboration
Biomass Engineering Program

- Development of "super plants" for biomass production
  - Establishment of research tools and resources of Brachypodium
  - Full-length cDNA clones
  - Transcriptome technology
  - Metabolome technology

Biomass microbial research
- Establishment of microbial research platform based on the discovery and value addition of useful microorganisms and their genes
  - Metagenome and single cell genome analyses of uncultured microorganisms
  - Discovery of novel microorganisms and their genes useful for bioresource engineering
  - Genome analyses and value adding of useful microorganisms

Mining and application of useful bioresources for biomass production

Relationship among Asian Countries
- To improve the standard of experimental animals in Asia, it was one of nine Asian organizations which established AMNRA, the Asian Mouse Mutagenesis and Resource Association. (The 5th Meeting, Taipei, 2011)
- Concluded MoU with Lanzhou Institute of Biological Products in 2006.
- A comprehensive agreement was signed with Korea Research Institute of Bioscience and Biotechnology (KRIBB) in 2006. Concluded MoU with KRIBB Bio-Evaluation Center (BEC) and Microbial Genomics and Applications Center (MGAC) in 2007.
- Concluded MoU with Taiwan National Yang Ming University in 2009.
- Concluded MoU with Korean National Research Resource Center (KNRRC) and Biological Resource Center, Institute of Microbiology Chinese Academy of Sciences (IMCAS-BRC) in 2009.
- Participated in the establishment of the Asian Network of Research Resource Centers (ANRRC) in 2009.
- RIKEN BRC participated the 3rd meeting of ANRRC in 2011.

Training and technology transfer
- We accept trainees from overseas. We have accepted trainees from National Laboratory Animal Center (Taiwan), Konkuk University (Korea), and Lanzhou Institute of Biological Products (China) etc.

The 3rd ANRRC meeting in Beijing

Public Relations Activity
- Maintenance of an Informative web site (Resource Information, Protocol, Q&A etc.)
- Monthly newsletter e-mailed from the divisions. It also introduces "This month's resource."
- At conferences, the BRC displays brochures to introduce its activities, distributes materials, and answers questions in the booth.

BRC’s web site shows conferences where BRC will present its activities. www.brc.riken.jp/
### RIKEN Institutes

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<tr>
<th>Institute</th>
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<tbody>
<tr>
<td>Microbe Division/JCM</td>
<td><a href="http://www.jcm.riken.jp/">http://www.jcm.riken.jp/</a></td>
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<td>Bioresource Information Division</td>
<td><a href="http://www.brc.riken.jp/lab/intro_info.html">http://www.brc.riken.jp/lab/intro_info.html</a></td>
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<tr>
<td>Support Unit for Quality Management</td>
<td>FAX +81-29-836-9182</td>
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<tr>
<td>Technology and Development Team for Mammalian Cellular Dynamics</td>
<td><a href="http://www.brc.riken.jp/lab/intro_heni.html">http://www.brc.riken.jp/lab/intro_heni.html</a></td>
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<td>Subteam for Manipulation of Cell Fate</td>
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