

Experimental Animal Division



Atsushi YOSHIKI

Head (December 2004 ~)

Yuichi OBATA

Head (~ November 2004)

Goal

Experimental Animal Division has two missions; one is to collect, maintain and distribute high quality animal resources, and the other is to develop novel technologies and animal models useful for biomedical research. Our ultimate goal is to facilitate scientific research on human health and diseases and contribute to human welfare, and basic biological sciences. Based on the needs of the scientific community, our division focuses on the mouse as one of the most important resources among the experimental animals. Since the 2002 fiscal year, the Experimental Animal Division of RIKEN BRC has been selected as a core center for experimental animal (mouse) by the National BioResource Project operated by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). In 2004 we started training courses to disseminate the relevant technologies, such as the latest methods for cryopreservation of mouse embryos and sperm. The RIKEN BRC is a founding member of the Federation of International Mouse Resources (FIMRe). FIMRe is a collaborating group of 17 resource centers worldwide, including the Jackson Laboratory, European Mouse Mutant Archive, with goal to archive and provide mouse strains to the research community. We also have been depositing information of our mouse strains in the International Mouse Strain Resource (IMSR), a one-stop shop of a searchable online database of mouse strains available worldwide. The RIKEN BRC has become the world's second largest mouse resource center in regard to the number of registered strains in IMSR. We appreciate the understanding and cooperation of the scientific community.

Activities

1. Collection, preservation and distribution of the mouse strains
2. Clean up of mouse strains
3. Cryopreservation of mouse embryos and spermatozoa
4. Quality control of the mouse strains
5. Collection and distribution of associated information
6. International Collaboration
7. Development of novel mouse resources and technology
8. Development of a strain characteristics database



2003 ~ 2005

Members**Heads**

Yuichi OBATA, Ph.D. (concurrent, 2001. 4 ~ 2004. 11)

Atsushi YOSHIKI, Ph.D. (2004. 12 ~)

Senior Research Scientists

Fumio IKE, Ph.D. (2001. 4 ~)

Atsushi YOSHIKI, Ph.D. (2001. 4 ~ 2004. 11)

Senior Technical Scientists

Noriko HIRAIWA (2001. 4 ~)

Chikako YOSHIDA-NORO, Ph. D. (2001. 4 ~ 2005. 3)

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Kazuyuki MEKADA, Ph. D. (2003. 8 ~)

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Chihiro TANAKA (2001. 6 ~)

Rika TAKASHIMA (2001. 6 ~)

Ryuji KODAKA (2003. 3 ~ 2005. 6)

Miki NAKAYAMA (2005. 5 ~)

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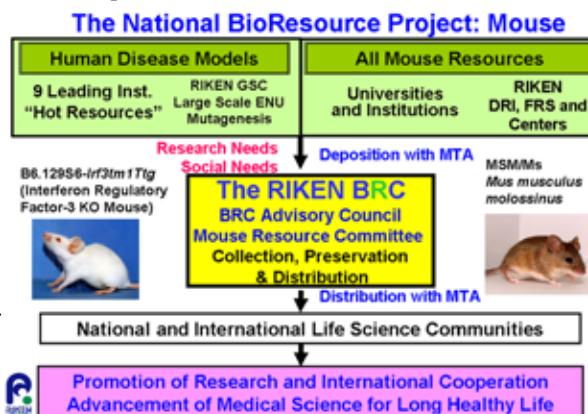
Ichirou MATSUMOTO (2003. 6 ~)	Takahiro OTSUKA (2001. 4 ~)
Hideo ITOGA (2001. 4 ~)	Tadashi FUJITA (2001. 4 ~ 2005. 4)
Noriko NOGUCHI (2001. 4 ~)	Masako SHIBAHARA (2001. 4 ~)
Sei CHOEI (2001. 4 ~)	Chieko YAMADA (2001. 4 ~)
Katsuya ONUKI (2001. 4 ~)	Noriko SHIRASAKA (2001. 4 ~)
Hiroyuki NUMAJIRI (2001. 8 ~)	Naoki OTAKA (2001. 10 ~)
Keiko TOMIYAMA (2002. 3 ~)	Tomohiro OKUBO (2002. 3 ~)
Yasuhiro YOKOTA (2002. 10 ~)	Yuji NOJIMA (2002. 10 ~ 2005. 5)
Mieko SUZUKI (2003. 9 ~ 2005. 1)	Kunihiro SAKURAI (2005. 2 ~)
Ryoko TAKEUCHI (2004. 11 ~)	Rika INABA (2005. 4 ~)
Chikako MIYAUCHI (2005. 4 ~ 2005. 8)	Satoe NAKAMURA (2005. 4 ~)
Naomi HIROSE (2005. 4 ~ 2005. 7)	Mika KOMURO (2005. 6 ~)
Yusuke OBA (2005.12 ~)	

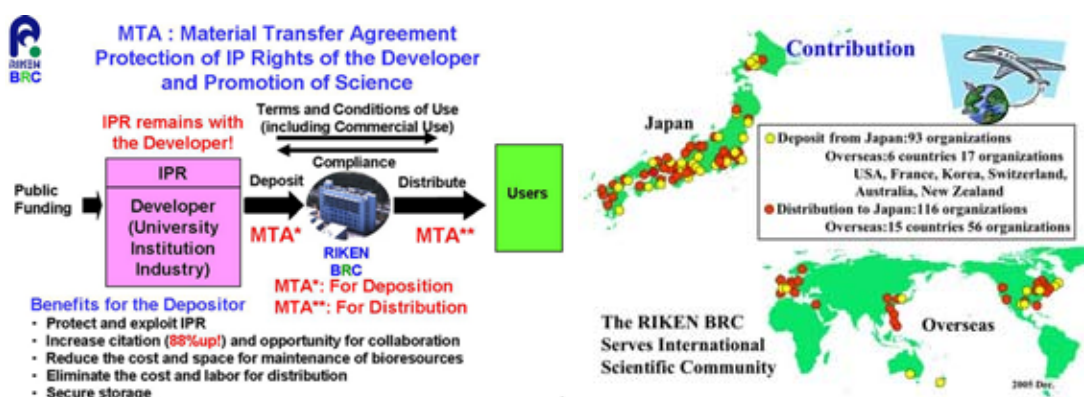
Specific aim

I. Bioresource Program

(1) Collection, maintenance, and distribution of the mouse strains

The Materials Transfer Agreement was used for collection and distribution of the mouse strains, in order to protect the intellectual property right of the Developer and to clarify for the Recipient of the biological resources the terms and conditions of use. Over 600 new strains were added or promised to be deposited in this fiscal year from universities and research institutes in Japan and overseas. A total of 1,678 strains have been collected and maintained as of October, 2005. These strains include 540 inbred/mutant, 413 transgenic, 274 knockout, 58 wild-derived, and 393 ENU mutant strains that are useful models for the study of cancer, immunity and allergy, endocrine disease, brain and neurological disorder, development and differentiation abnormality, and sensory organ abnormality. A total number of 2,907 pairs of the strains have been distributed to Japanese and overseas users from both non-profit





and for-profit institutions. The proportions of different categories of strains in the distribution were as follows: inbred/mutant; 32.5%, transgenic; 23.9%, knockout; 37.1%, wild-derived; 6.0% and ENU mutant; 0.5%.

(2) Clean up of mouse strains

The clean up of deposited mouse strains in our center has contributed to the high quality standard of animal experimentation in Japan. We have received 3,872 mice of 672 strains for deposition as live animals since June, 2002. All the strains have been tested for infection of 8 dangerous microorganisms. Based on the results of microbiological testing, mice have been transferred into the Bio-bubble housing facilities either in negative or positive pressure, and bred until an appropriate number of mice have been accumulated to produce specific-pathogen free mice by IVF-ET (in vitro fertilization and embryo transfer) or Cesarean section. Up to now we have completed clean-up of 621 strains and transferred them into the SPF barrier facility in the BRC main building.

(3) Cryopreservation of mouse embryos and spermatozoa

Cryopreservation of embryos and sperm is a key technology for a successful mouse resource center. Two-cell stage embryos are frozen-stored in vitrification solution containing Ethylene Glycol, Ficoll and Sucrose (EFS). The spermatozoa from the mutant and genetically engineered strains are also cryopreserved by using raffinose and skim milk as cryoprotective agents. Distribution of cryopreserved embryos and sperm has been done after assessment of survival rate of these cryostocks. By September 2005, 1,068 strains have been preserved as frozen embryos or sperm; 968 strains (345,901 embryos) in 13,930 cryotubes as frozen embryos, and 550 strains in 16,454 straws as frozen sperm. Ovaries from mutant and genetically engineered strains have been also frozen-stored successfully.

(4) Quality control of the mouse strains

(i) Microbiological monitoring

After clean-up treatment, the periodic microorganism tests for 18 or 21 major items have been carried out for the individual racks in the housing facilities by using sentinel mice (1,688 tests from April 2004 to September 2005). Pathogen-free mice were transferred into the SPF breeding room in the barrier. Microbiological environment of our facility has been also periodically monitored at 312 points for bacteria and fungi.



Training Courses

Transfer of advanced technologies for best utilization and analysis of the resources

“Cryopreservation of mouse embryos and sperms”



Snapshot: Students work with embryos and smile with the Certificate at the end of the course

2003 ~ 2005

(ii) Genetic monitoring

In order to make a genetic profile of strains in our center, we performed biochemical tests for 15 standard markers. In this fiscal year, the PCR genotyping tests were performed on 21,260 samples of 666 genetically engineered strains. The PCR genotyping protocol of each strain is now available from our web page and can be downloaded as a PDF file.

(iii) Karyotyping and Chromosomal Mapping

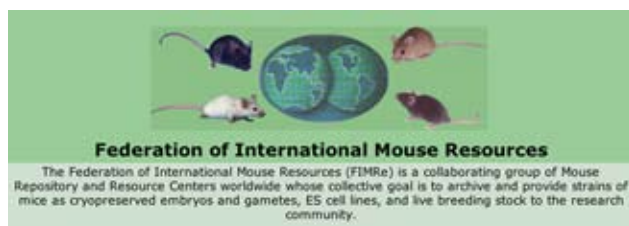
For the surveillance of the variation of mouse strains with chromosomal aberrations, we analyzed the karyotype using several banding methods. Chromosome preparations were made from spleen cell cultures. The integration sites of the transgenes were also examined by fluorescence in situ hybridization (FISH).

(5) Collection and distribution of associated information

By October 2005 the number of user registration has reached 1,323. The Web page of Experimental Animal Division has received 30,699 access counts. Information on the mouse strains and relevant literature were collected from the public databases, attached to the mouse strains at the time of distribution, and made available to the scientific community through the web page. Periodic e-mail newsletters were distributed to the users via the internet. We started distribution of this e-mail newsletter with an article entitled "Mouse of the Month" to introduce an excellent mouse model to the research community. According to the "Law Concerning the Conservation and Sustainable Use of Biological Diversity Through Regulations on the Use of Living Modified Organisms (Cartagena Law)" the relevant format of the document has been prepared and updated.

(6) International collaboration

The RIKEN BRC is a founding member of the Federation of International Mouse Resources (FIMRe; <http://www.fimre.org>). FIMRe is a collaborating group of Mouse Repository and Resource Centers worldwide, including the Jackson Laboratory, European Mouse Mutant Archive (EMMA) and other centers whose goal is to archive and provide mouse strains to the research community (Nature 432, p541, 2004). We also have been depositing information of our mouse strains in the International Mouse Strain Resource (IMSR), a one-stop shop of a searchable online database of mouse strains available worldwide to assist the international scientific community in locating and obtaining mouse resources (<http://www.informatics.jax.org/imsr/index.jsp>). Our Division promotes communication and collaboration with Asian countries in regard to the mouse resources and the life science. On August 1, 2005, the National Applied Research Laboratories in Taiwan and the RIKEN BRC joined in the Memorandum of Understanding to promote cooperation in areas of mutual interest in laboratory animal science. We visited the Korea Research Institute of Bioscience and Biotechnology to introduce the recent activities of the RIKEN BRC on June, 2005. Many scientists from Asian countries such as Taiwan, the South Korea, China, Singapore and Thailand have visited the RIKEN BRC for future collaborations in 2004-2005.



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II. Development Program

The technologies necessary for the promotion of the resource, especially for collection, preservation, and distribution of the mouse strains, were developed as follows during last two years.

(1) Development of novel mouse resource and its technology

(i) The development of a genetically uniform mouse strain: Establishment of inbred mutant strains by extensive inbreeding, and introduction of a mutant gene into the inbred strains by backcrossing (congenic strains).

(2) Development of a strain characteristics database

In order to achieve high quality genetic control, the following databases were developed.

(i) Development of a morphology and patho-physiology database

We collected photographic images of the coat colors of 104 mouse strains in our facility. Behavioral phenotypes were also recorded by digital video camera. Body weight and length were measured for 2,489 mice of 93 strains. X-ray images of 806 mice from 109 strains were prepared by a FUJI BAS-5000 image analyzer. Histopathological sections were prepared from various inbred and mutant strains for microscopic images. The blood pressure from 87 strains (1,092 mice), blood counts for 5 items from 113 strains (1,511 mice), HbA1c from 27 strains (103 mice) and blood biochemistry from 82 strains (548 mice) were measured.

(ii) Development of a genome analysis method for genetically engineered mice

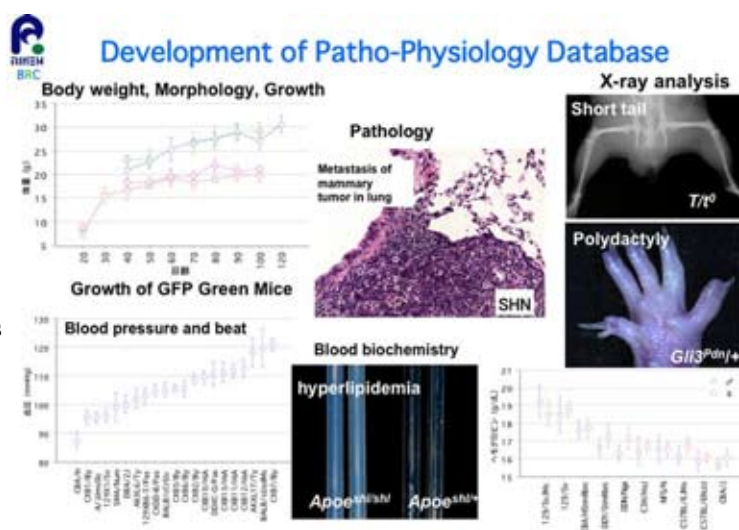
It is essential to establish a rigorous and accurate genotyping protocol for genetically engineered mice. For this purpose we established standard protocols using adaptor ligation PCR and inverse PCR to determine the genomic sequence flanking to the transgene of the transgenic mice or the neo gene in the targeted allele.

(iii) Development of technologies for microorganism infection

It is important to control pathogenic microorganisms more rigorously, since we maintained many genetically engineered mice which are potential strains of immuno-deficient or susceptible to infections.

We also have given much attention to the protection against microorganisms imported from overseas institutions to protect our facility barrier. To minimize the risk of undesirable infections and establish a

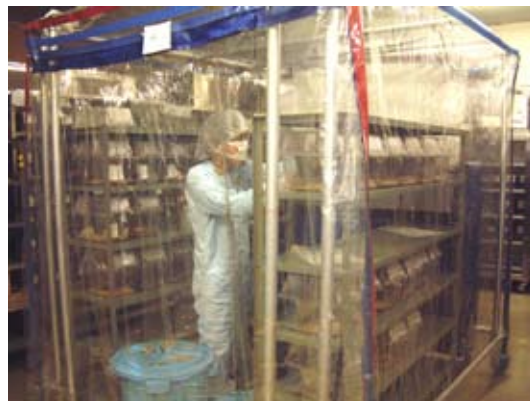
rigorous detection system for microorganisms to protect the facility barrier, we exchanged information and collaborated with the Central Institute for Experimental Animal (Kawasaki, Japan) and the National Institute of Infectious Diseases (Tokyo, Japan).



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Quarantine facility: deposited mice are serologically tested for infectious diseases.



BioBubble housing facility: Seropositive mice are bred in the BioBubble of negative pressure.



BRC barrier facility: mice are maintained in the barrier facility equipped with microisolator cagings.



BRC wash room: all the cages are sterilized by autoclaving.



BRC embryo manipulation room: *in vitro* fertilization, embryo transfer and freezing of embryos and sperm are carried out.



Cryopreserved embryos and sperm are stored in the liquid nitrogen tanks for many years.

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Publications

Original papers (*Peer reviewed Journals)

Yoshiki A, Moriwaki K.: Mouse phenotype research: Implications of genetic background. *ILAR Journal* 47: 94-102, 2006. *

Yonezawa S, Yoshizaki N, Kageyama T, Takahashi T, Sano M, Tokita Y, Masaki S, Inaguma Y, Hanai A, Sakurai N, Yoshiki A, Kusakabe M, Moriyama A, Nakayama A.: Fates of Cdh23/CDH23 with Mutations Affecting the Cytoplasmic Region. *Human Mutation* 27:88-97, 2006. *

Ogasawara M, Imanishi T, Moriwaki K, Gaudieri S, Tsuda H, Hashimoto H, Shiroishi T, Gojobori T, Koide T.: Length variation of CAG/CAA triplet repeats in 50 genes among 16 inbred mouse strains. *Gene* 349:107-19, 2005. *

Sakai T, Kikkawa Y, Miura I, Inoue T, Moriwaki K, Shiroishi T, Satta Y, Takahata N, Yonekawa H.: Origins of mouse inbred strains deduced from whole-genome scanning by polymorphic microsatellite loci. *Mamm Genome* 16:11-19, 2005. *

Sasaki S, Mori D, Toyo-oka K, Chen A, Garrett-Beal L, Muramatsu M, Miyagawa S, Hiraiwa N, Yoshiki A, Wynshaw-Boris A, Hirotsune S.: Complete loss of Ndel1 results in neuronal migration defects and early embryonic lethality. *Mol Cell Biol.* 25, 7812-7827, 2005. *

Toyo-Oka K, Sasaki S, Yano Y, Mori D, Kobayashi T, Toyoshima YY, Tokuoka SM, Ishii S, Shimizu T, Muramatsu M, Hiraiwa N, Yoshiki A, Wynshaw-Boris A, Hirotsune S.: Recruitment of katanin p60 by phosphorylated NDEL1, an LIS1 interacting protein, is essential for mitotic cell division and neuronal migration. *Hum Mol Genet.* 14:3113-3128, 2005. *

Abe K, Noguchi H, Tagawa K, Yuzuriha M, Toyoda A, Kojima T, Ezawa K, Saitou N, Hattori M, Sakaki Y, Moriwaki K, Shiroishi T.: Contribution of Asian mouse subspecies *Mus musculus molossinus* to genomic constitution of strain C57BL/6J, as defined by BAC-end sequence-SNP analysis. *Genome Res.* 14:2439-2447, 2004. *

Oka A, Mita A, Sakurai-Yamatani N, Yamamoto H, Takagi N, Takano-Shimizu T, Toshimori K, Moriwaki K, Shiroishi T.: Hybrid breakdown caused by substitution of the X chromosome between two mouse subspecies. *Genetics* 166:913-924, 2004. *

Sakai T, Miura I, Yamada-Ishibashi S, Wakita Y, Kohara Y, Yamazaki Y, Inoue T, Kominami R, Moriwaki K, Shiroishi T, Yonekawa H, Kikkawa Y.: Update of mouse microsatellite database of Japan (MMDBJ). *Exp Anim.* 53:151-154, 2004. *

Spiridonova LN, Chelomina GN, Moriwaki K, Yonegawa H, Bogdanov AS.: [Genetic and taxonomic diversity of the house mouse *Mus musculus* from the asian part of the former Soviet Union.] *Genetika* 40:1378-1388, 2004. Russian. *

2003 ~ 2005

- Suzuki Y, Komi Y, Ashino H, Yamashita J, Inoue J, Yoshiki A, Eichmann A, Kojima S.: Retinoic acid controls blood vessel formation by modulating endothelial and mural cell interaction via suppression of Tie2 signaling in vascular progenitor cells. *Blood* 104, 166-169, 2004. *
- Yasuda N, Moriwaki K, Furuyama S.: Distribution and properties of arginase in the salivary glands of four species of laboratory mammals. *J Comp Physiol.* 174:237-242, 2004. *
- Moriwaki K.: The Mouse and Wood Mouse---From Laboratory Animal Model to Wild Animal Models. *Zool. Sci.* 21:1222, 2004.*
- Floyd JA, Gold DA, Concepcopn D, Poon TH, Wang X, Keithley E, Chen D, Ward EJ, Chinn SB, Friedman RA, Yu H-T, Moriwaki K, Shiroishi T, and Hamilton BA. : A natural allele of Nxf1 suppresses retrovirus insertional mutations. *Nature Genetics* 35, 221-228, 2003.
- Mekada K.: [Phylogeny and taxonomic issues in the genus *Microtus* (Arvicolinae)] *Experimental Herbivora* 29, 1-10, 2005. Japanese. *
- Moriwaki K.: [What we learn from wild mice.] *Proceedings of the Laboratory of Animal Breeding, Tokyo University of Agriculture* 51, 69-89, 2004. Japanese.
- Moriwaki K.: [Significance of model animals in life science: genetic and biological implication. In Generation and maintenance of model animals (Moriwaki K., Yamamura K, Yonekawa H. eds.)] *Life-Science Information Center Co., Ltd, Tokyo.* Japanese.
- Moriwaki K.: [Human and mouse from the viewpoint of the genome.] *Science Council of JAPAN Chugoku and Shikoku Branch News* 37, 7-15, 2004. Japanese.
- Moriwaki K.: [laboratory and Institute tour (50): RIKEN BioResource Center, RIKEN TSUKUBA INSTITUTE.] *THE IDEN* 58, 94-99, 2004. Japanese.
- Moriwaki K.: [learning how to live from living thing.] *Genes Genetic Systems* 79 (Supplement), 3-4, 2004. Japanese.
- Mrowaki K.: [Book review: Solving the mystery in the evolution of life (Ino T. ed.)] *The Japanese Association for Laboratory Animal Science News* 53, 118, 2004. Japanese.
- Yoshiki A.: [Regulation of gene expression by expressed pseudogenes.] *Special Review Saibo Kogaku* 23, 9, 1064-1069, 2004. Japanese.
- Yoshiki A.: [Preservation and supply of animal models for human diseases. In Generation and maintenance of model animals (Moriwaki K., Yamamura K, Yonekawa H. eds.)] *Life-Science Information Center Co., Ltd, Tokyo.* Japanese.

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Yoshiki A.: Alopecia / Atrichia. In Generation and maintenance of model animals (Moriwaki K., Yamamura K, Yonekawa H. eds.)] Life-Science Information Center Co., Ltd, Tokyo. Japanese.

Oral Presentations

Mekada K, Arai F, Murakami A, Oota S, Moriwaki K, Obata Y, Yoshiki A.: Analysis of a new recessive mutant with abnormal walking. 19th International Mouse Genome Conference, Strasbourg, France, November, 2005.

Sugimoto M, Mekada K, Karashima Y, Yuzuriha M, Ko MSH, Nagaraja R, Tan SS, Takagi N, Abe K.: Narrowing down the position of the t-complex recessive lethal mutation *tlw5* into 180kb by BAC rescue. 19th International Mouse Genome Conference, Strasbourg, France, November, 2005.

Yoshiki A.: The RIKEN BioResource Center in the International Network of Mouse Strain Resources. Mouse Genetics Symposium of the Korean Society for Molecular and Cellular Biology, Seoul, Korea, September, 2005.

Yoshida-Noro C, Goto N, Hisaki H, Suzuki M, Suzuki A, Yoshiki A, Obata Y, Moriwaki K, Nagase H, Tadano-Aritomi K.: Gene expression profiling of the developing testes from glycosyltransferase-deficient mice bearing defects in spermatogenesis. International Society of Developmental Biologists 2005, Sydney, Australia, September, 2005.

Yoshiki A.: Establishment of mouse strain resources in RIKEN BioResource Center. 2005 The International Symposium of the Korean Association for Laboratory Animal Science, Seoul, Korea, June, 2005.

Kaneko S, Tsuda K, Mekada K, Moriwaki K, Takahata N, Satta Y.: Rapid turnover of regulatory processed pseudogenes of *Makorin1* in rodents and primates. Molecular Biology & Evolution 2005, Auckland, New Zealand, June, 2005.

Moriwaki K.: Genetic background of the laboratory mouse strains and effect of genetically remote wild-derived chromosomes. US-Japan Cooperative Program for Laboratory Animal Sciences 2004 Meeting, Florida, USA, October, 2004.

Mise N, Sugimoto S, Fuchigami T, Kobayakawa S, Ike F, Tada T, Noce T, Abe K.: A microarray analysis of gene expression in mouse primordial germ cells, in vitro formed PGC and embryo-derived stem cells. The 4th biennial meeting on Germ Cells, Cold Spring Harbor Laboratory Meeting, New York, USA, October, 2004.

Nakata H, Mekada K, Hiraiwa N, Ike F, Moriwaki K, Obata Y, Yoshiki A.: Genetic quality control of the genetically engineered mice in RIKEN BioResource Center. 28th Annual Meeting of the Molecular Biology Society of Japan, Fukuoka, December, 2005.

2003 ~ 2005

- Sugimoto M, Mekada K, Karashima Y, Yuzuriha M, Ko MSH, Nagaraja R, Tan SS, Takagi N, Abe K.: Rescue of the t-complex recessive lethal mutation *tlw5* using a BAC clone. 28th Annual Meeting of the Molecular Biology Society of Japan, Fukuoka, December, 2005.
- Mekada K, Arai F, Murakami A, Oota S, Abe K, Moriwaki K, Obata Y, Yoshiki A.: Analysis of a new recessive mutant with degeneration of neural retina and abnormal walking. The 22nd Annual Meeting of The Japanese Society of Animal models for Human Diseases, Ikaho, November, 2005.
- Sugimoto M, Mekada K, Karashima Y, Yuzuriha M, Ko MSH, Nagaraja R, Tan SS, Takagi N, Abe K.: Rescue of the t-complex recessive lethal mutation *tlw5* using a BAC clone. 77th Annual Meeting of The Genetics Society of Japan, Sendai, September, 2005.
- Kaneko S, Tsuda K, Mekada K, Moriwaki K, Takahata N, Satta Y.: Rapid turnover of regulatory processed pseudogenes of *Makorin1* in rodents and primates. 77th Annual Meeting of The Genetics Society of Japan, Sendai, September, 2005.
- Sugimoto M, Yuzuriha M, Toyoda A, Mekada K, Karashima Y, Ko MSH, Nagaraja R, Sakaki Y, Tan SS, Takagi N, Abe K.: Searching for the responsible gene of a mouse t-complex recessive lethal mutation *tlw5* related to the growth and differentiation of epiblast. The 38th Annual Meeting of the Japanese Society of Developmental Biology, Sendai, June, 2005.
- Murakami A, Nakata H, Yoshiki A.: Change of insertional sequence length of alopecia mutant mice. The 52nd Annual Meeting of the Japanese Association for Laboratory Animal Science, Tokyo, May, 2005.
- Ike F, Kojima R, Yoshiki A, Obata Y.: Microbiological monitoring in RIKEN BioResource center mouse husbandry (3). The 52nd Annual Meeting of the Japanese Association for Laboratory Animal Science, Tokyo, May, 2005.
- Mochida K, Okawa M, Kogiso A, Miyazaki F, Kobayashi A, Fujita M, Hiraiwa N, Yoshiki A, Obata Y, Ogura A.: In vitro fertilization rates and efficiency of producing mouse embryos from 587 strains in RIKEN BRC. The 52nd Annual Meeting of the Japanese Association for Laboratory Animal Science, Tokyo, May, 2005.
- Mekada K, Arai F, Oota S, Moriwaki K, Obata Y, Yoshiki A.: A new mutant mouse with abnormal walking trait. The 52nd Annual Meeting of the Japanese Association for Laboratory Animal Science, Tokyo, May, 2005.
- Nakata H, Arai F, Mekada K, Ohtuka S, Ike F, Moriwaki K, Obata Y, Yoshiki A.: The study of causes of death in female green mice. The 52nd Annual Meeting of the Japanese Association for Laboratory Animal Science, Tokyo, May, 2005.

2003 ~ 2005

- Yoshiki A, Mekada A, Oota S, Murakami A, Moriwaki K, Obata Y.: Establishment of the morphological information of the mouse resource. RIKEN SYMPOSIUM, Wako, March, 2005.
- Sugimoto M, Yuzuriha M, Mekada K, Karashima Y, Ko MSH, Nagaraja R, Tan SS, Takagi N, Abe K.: Phenotypic and genomic analysis of the mouse t-complex recessive lethal mutation *tclw5*. 27th Annual Meeting of the Molecular Biology Society of Japan, Kobe, December, 2005.
- Obata Y.: Development, collection, preservation, and distribution of the laboratory animal (mouse). 27th Annual Meeting of the Molecular Biology Society of Japan, Kobe, December, 2005.
- Obata Y, Yoshiki A.: Present status of the mouse resource in the National BioResource Project. 27th Annual Meeting of the Molecular Biology Society of Japan, Kobe, December, 2005.
- Yokota H, Nakamura S, Yoshiki A, Himeno R.: Observation of mouse cardiac muscle cells using a 3-Dimensional Internal Structure Microscope. The 18th Annual Meeting of the Japanese Society for Medical and Biological Engineering, Matsuyama, November, 2005.
- Mekada K.: Phylogeny and taxonomic issues in the genus *Microtus* (Arvicolinae). The 30th Annual Meeting of the Society for Experimental Herbivora Research, Hayama, November, 2004.
- Moriwaki, K.: Next generation model animals from Japan “*Mus musculus* and *Apodemus speciosus*”. The 75th Annual Meeting of the Zoological Society of Japan, Kobe, September, 2004.
- Kaneko S, Tsuda K, Mekada K, Moriwaki K, Takahata N, Satta Y.: Rapid turnover of regulatory processed pseudogenes of *Makorin1* in rodents and primates. 76th Annual Meeting of the Genetics Society of Japan, September, 2004.
- Imamichi S, Noro-Yoshida C, Goto N, Oba N, Amanuma H, Atsumi T.: Gene expression of neural, lymphatic, and primordial germ cell in the hematopoietic stem cell line. The 37th Annual Meeting of the Japanese Society of Developmental Biology, Nagoya, June, 2004.
- Obata Y.: Intellectual property right of laboratory animals in the independent administrative corporations, and expansion of genetic resources into the industrial world. Japanese Association of Laboratory Animal Facilities of National Universities, Inuyama, June, 2004.
- Mise N, Sugimoto M, Kobayakawa S, Ike F, Tada T, Nose T, Abe K.: Comprehensive gene expression profiling of mouse embryonic stem cell and primordial germ cell. The 37th Annual Meeting of the Japanese Society of Developmental Biology, Nagoya, June, 2004.
- Oba M, Noro-Yoshida C, Goto N, Imamichi S, Amanuma H, Atsumi T.: Establishment of EGF dependent neural stem cell from ES cell. The 37th Annual Meeting of the Japanese Society of Developmental

2003 ~ 2005

Biology, Nagoya, June, 2004.

Goto N, Tadano K, Suzuki M, Miyazaki H, Ishizuka I, Suzuki A, Obata Y, Moriwaki K, Noro-Yoshida C.: Expression profiling of glycosylation-related genes in mice testes. The 37th Annual Meeting of the Japanese Society of Developmental Biology, Nagoya, June, 2004.

Mekada K, Yoshiki A, Ogura G, Moriwaki K, Obata Y, Oda SI.: Basic characteristics of newly established *Mus caroli* strain derived from Okinawa Island. The 51st Annual Meeting of the Japanese Association for Laboratory Animal Science, Nagasaki, May, 2004.

Yoshiki A, Mekada K, Fujimoto Y, Kobayashi M, Abe K, Mochida K, Moriwaki K, Obata Y.: Establishment of a novel model mouse strain for dystonia musculorum. The 51st Annual Meeting of the Japanese Association for Laboratory Animal Science, Nagasaki, May, 2004.

Noro-Yoshida C, Utsuno MM, Kitasaka Y, Obata Y, Moriwaki K.: Genetic background monitoring by microsatellite DNA polymorphism. The 51st Annual Meeting of the Japanese Association for Laboratory Animal Science, Nagasaki, May, 2004.

Ike F, Kojima R, Murakami A, Yoshiki A, Obata Y, Moriwaki K.: Mouse infectious diseases encountered in RIKEN BioResource center quarantine. The 51st Annual Meeting of the Japanese Association for Laboratory Animal Science, Nagasaki, May, 2004.