

# BioResource Now!

Issue Number 7 January 2011

Hot News  
No.34

## Report on the 18th International Workshop on Genetic Systems in the Rat

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Institute of Laboratory Animals, Graduate School of Medicine, Kyoto Univ.

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Three-part Series

## Convention on Biological Diversity and the Circumstances Surrounding Genetic Resources (2)

Mutsuaki Suzuki, Director, Intellectual Property Unit, National Institute of Genetics

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Hot News (NO.34)

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## Report on the 18th International Workshop on Genetic Systems in the Rat

The 18th International Workshop on Genetic Systems in the Rat was held at Kyoto University from November 30 to December 3, 2010. This workshop is an international conference for rat research communities. The conference has been held in even-numbered years since 1977 and has a rich history. The workshop conducted this year was the second such workshop in Kyoto and the third in Japan, following those held in Sapporo in 1994 and Kyoto in 2002. Since inbred rat strains have been used in implant research, in the earliest years, the workshop emphasized on histocompatibility genes, and it was formerly called the International Workshop on Alloantigenic Systems in the Rat. The importance of using genetically controlled rat strains is not limited to implant research, and therefore, in 2000, the workshop was renamed to its current name. The workshop has been closely associated with the National BioResource Project for the Rat (NBRP-Rat), and the 14th workshop (in Kyoto in 2002) was organized around the same time with the initiation of the first term of NBRP-Rat.



The participants in the workshop this year presented the latest progress in rat research, which was extremely fascinating. Some of the findings presented were as follows: **1)** knockout rats or genetically modified rats can now be artificially developed; **2)** next-generation sequencers have become available, enabling whole-genome sequencing and expression profiling of disease model rat strains developed by genetic breeding approaches; **3)** physiological conditions in normal and disease states can be thus understood as genetic networks, and biological functions of humans and rats

can be comparatively analyzed to a deeper extent; and **4)** research foundations, such as NBRP-Rat in Japan, the Rat Resource and Research Center (RRRC) and the Rat Genome Database (RGD) in the U.S., and European Large-scale Functional Genomics in the Rat for Translational Research (EURATRANS), were improved and expanded.

### Scientific program

#### Nov 30 (Tue)

##### - Welcome lectures

(History/Model/Translational research)

#### Dec 1 (Wed)

##### - Disease model-1 (using SHR, FH, LH, BN strains)

##### - Disease model-2

(Common disease, Mitochondrial genome)

##### - Genome

##### - Transcriptome/Network

##### - Poster presentations:

History, Reproduction, ES/iPS, ZFN, Transcriptome, Disease models

(Cancer, Hypertension, Diabetes, ADHD, Behavior, Tremor, Epilepsy, Cataract, Eosinophilia, ...)

#### Dec 2 (Thu)

##### - Disease model-3

(Hypertension, Nephritis, LDLR, Netrin4)

##### - Stem cells

##### - Manipulating the genome (using ZFN)

##### - Behavior/Neuroscience

#### Dec 3 (Fri)

##### - Cancer

##### - Resource/Database

- History of rat research
- Importance of human disease models
- Application to translational research
- Elucidation of pathology in rat models of various human diseases such as cancer, hypertension, diabetes, lifestyle diseases, nephritis, epilepsy, essential tremor, attention-deficit/hyperactivity disorder, and cataract.
- Whole-genome DNA sequence information of rat strains
- Mitochondrial genome analysis and diseases
- Genetic network analysis of diseases
- Development and application studies in rat embryonic stem (ES) cells and induced pluripotent stem (iPS) cells
- Development system of novel genetically modified rats and their uses in disease analysis
- Information on rat resource centers and databases

All the presentations were on cutting-edge topics in rat research, and participants and leading researchers promoting rat research in Japan, the EU, and the U.S. actively exchanged opinions. There were a total of 180 participants, including 66 overseas participants (29 from the U.S., 14 from Germany, 11 from the UK, 7 from the Czech Republic, 2 from Holland, 1 from China, 1 from Ghana, and 1 from Taiwan) and 114 domestic residents. Thirty-seven percent of the participants were overseas participants, and many young, domestic and international researchers participated in the workshop along with prominent figures in international rat communities. Therefore, we expect that new international research collaborations and interactions among researchers will have been greatly enhanced because of this international rat workshop.

At the opening ceremony, following my opening remarks as an organizer and the welcome address by Dr. Nagahiro Minato, Dean, Graduate School of Medicine and Faculty of Medicine, Kyoto University, the guest address was delivered by Mr. Kazunari Tanaka, Director for Genome Research, Life Sciences Division, Research Promotion Bureau, the Ministry of Education, Culture, Sports, Science, and Technology.

Academic research presentations included invited lectures, general oral presentations, and poster presentations, and covered the following topics:



Photo : A Conference Room at the Workshop

This workshop was hosted by the organizing committee of the 18th International Workshop on Genetic Systems in the Rat and was co-hosted by NBRP-Rat and the Kyoto University Global COE Program, "Center for Frontier Medicine," and supported by the Japan Society for the Promotion of Science (JSPS), the Japan Vascular Disease Research Foundation, the Kyoto University Foundation, the Federation of

Pharmaceutical Manufacturers' Associations of Japan, the Kansai Laboratory Animal Research Association, and many corporations and individuals. I would like to express my deepest gratitude to all of them for their enthusiastic support.

Official website of the 18th International Workshop on Genetic Systems in the Rat:  
<http://www.anim.med.kyoto-u.ac.jp/workshop2010/>



Three-part Series

Convention on Biological Diversity and the Circumstances Surrounding Genetic Resources (2) "Particulars of the Nagoya Protocol and its Impact"

Mutsuaki Suzuki, Director, Intellectual Property Unit, National Institute of Genetics



The official website of the COP10 support committee:  
<http://kankyojoho.pref.aichi.jp/cop10/index.html>

Essentials of the Protocol

Genetic resources of animals, plants, and microorganisms were once the "common resources of mankind." However, the Convention on Biological Diversity ratified in 1992 defined genetic resources as the "resources of each country" and stated the necessity of benefit sharing. Thereafter, although international discussions were further advanced over the years and the Bonn Guidelines were drafted in 2002, specific international legal regulations regarding the management of genetic resources had not existed for a long time.

In 2010, the Nagoya Protocol, the first international legal agreement, has been adopted. As a result, obligations to establish domestic laws and regulations were articulated. In addition, it was determined that the sharing of both monetary and non-monetary benefits should be specifically defined in the mutually agreed terms (MATs). The protocol also defined the obligation to set checkpoints that would monitor the prior agreements, MATs, and the use of genetic resources in the user's country.

Furthermore, the protocol also contained terms regarding traditional knowledge, the noncommercial use of genetic resources for promoting research that contributes to resource conservation, the consideration of the emergency states caused by pathogens, the associations with international treaties, and the investigation of multinational benefit-sharing mechanisms.

The adherence to these legal regulations is expected to promote access to and use of genetic resources.

Specific procedure to request genetic resources

The specific process of receiving genetic resources is described below:

1. Prior informed consent (PIC) (Fig. 1- ①) should be signed by the provider and the government of the provider's country.
2. With regard to collection of genetic resources with on-site collaborators, a MAT (Fig. 1- ②) should be signed for consensus on conditions regarding nonmonetary benefit sharing, such as research collaboration and education, and monetary benefit sharing, such as royalties. The transfer of genetic resources will then be possible with the certificate issued by the government (Fig. 1- ③ and - ④).
3. Subsequently, the use of the genetic resources will be monitored at the checkpoints established in the user's country.

New terms included in the latest protocol are, for example, the establishment of domestic laws in providers' countries, administration offices issuing certificates, and checkpoints in users' countries. The providers should view the process described above from the opposite standpoint; however, specific procedures will be regulated by domestic laws, which will be discussed for establishment in the future (see Fig. 1).

Traditionally, domestic laws and administrative measures had not been determined in many provider countries, and thus, issues such as unclear application procedures and lengthy time requirements for accessing resources were encountered. However, the Nagoya Protocol made the procedures for accessing genetic resources more transparent.

Impacts on Bioresource Affiliates

Bioresource affiliates should consider both the provider's and collector's point of view. First, regarding collection, the affiliates should keep in mind that collecting genetic resources in a country with established domestic laws require not only the permission of the providing researchers or sellers but also that of the government of the providers' country. For example, if we purchase a medicinal herb that is sold as a digestive medicine overseas and bring it back to Japan for distribution as a genetic resource, we will be accused of violating the law. It is mandatory to obtain a certificate from the government of the providers' country (PIC) and a mutual agreement with the providers for the intended use (MAT).

In addition, when providing resources, we must follow the system as per the established domestic laws. Although the details of the system have not yet been determined, it is expected that a new department will be installed in the country, from which registration and authorization will be needed. The establishment of an administration system that allows smooth transactions is awaited. Moreover, a clarification is necessary regarding the appropriate nonmonetary benefits for bioresource distributors when MATs are determined for distribution. For example, does the statement of bioresource use in all the published documents give the appropriate benefits to bioresource distributors? Additional discussions as to whether further agreed terms are necessary are awaited.

We should watch the circumstances surrounding the domestic laws in relevant countries as each country establishes its laws. Moreover, a multinational benefit distribution system, which was recently proposed, may target the genetic resources in the past, and thus, future trends should be carefully monitored.

In the future, guidelines for universities and MAT formats will be necessary for implementing the protocol. In addition, although the protocol has not yet been put into effect, we should adhere to the Convention on Biological Diversity and the Bonn Guidelines, which are already in effect.

The circumstances of each country and treaties will be described in the next issue.

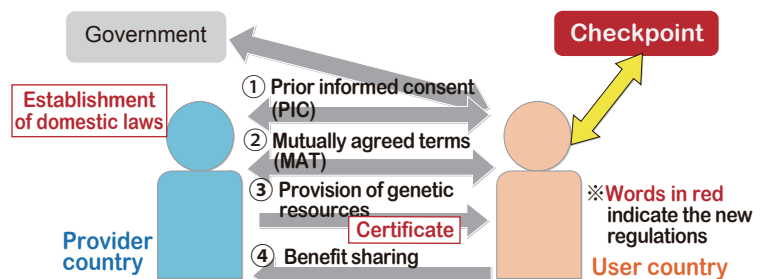


Fig. 1: Procedure to receive genetic resources (future expectation)

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Editor's Note

Rat resources have not been as much paid attention as more manageable mouse resources have been. However, knockout rats can now be developed and are attracting significant attention (*Science*, vol. 330, 1607, 2010). The rat resource center (NBRP-Rat), which is led by Dr. Serikawa, is currently the world's greatest institution in terms of its scale and quality, and it is trusted by researchers worldwide. As stated in the Nagoya Protocol of the 10th Conference of the Parties to the Convention on Biological Diversity (COP10), the role of resource centers will be increasingly important for accessing and using bioresources in future. We will continue to deliver the latest information from this year. (Y.Y.)

BioResource Information

- (NBRP) [www.nbrp.jp/](http://www.nbrp.jp/)
- (SHIGEN) [www.shigen.nig.ac.jp/](http://www.shigen.nig.ac.jp/)
- (WGR) [www.shigen.nig.ac.jp/wgr/](http://www.shigen.nig.ac.jp/wgr/)
- (JGR) [www.shigen.nig.ac.jp/wgr/jgr/jgrUrlList.jsp](http://www.shigen.nig.ac.jp/wgr/jgr/jgrUrlList.jsp)

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