Issue Number4 January 2008

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Attention! Resources

Mouse Resources and Nobel Prize

Ken-ichi Yamamura, Professor,
Institute of Molecular Embryology and Genetics, Kumamoto University

Hot News from Abroad No.22

Plant and Animal Genome XIV Conference

Left to right: a rat, a mouse, and a harvest mouse

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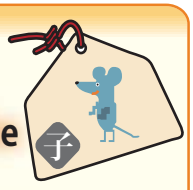
- JGR http://www.shigen.nig.ac.jp/wgr/jgr/jgrUrlList.jsp

Announcement

"NBRP Kickoff Symposium"
March 10, 2008 (Monday)
at Josui Kaikan 2F, Star Hall, Orion Room, and Pegasus
Hitotsubashi, Chiyoda-ku, Tokyo
http://www.kaikan.co.jp/josui

! Attention Resources No.1

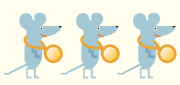


Mouse Resources and Nobel Prize

Ken-ichi YAMAMURA
Professor, Institute of Molecular Embryology and Genetics, Kumamoto University

According to the Chinese zodiac, 2008 is the year of the "mouse." Actually, I was born in the year of the "mouse" and I have engaged in mouse research for more than 30 years. Although I have a medical license to treat humans, I am mainly a mouse researcher who constructs gene knockout mice using the exchangeable gene trap method and who develops mouse resources. In other words, I immerse myself in a profession of fiddling around with mice. Japanese language often contains equivocal expressions: for example, the meaning of the Japanese word "Nezumi" is unclear; it may indicate a mouse, a rat, or a harvest mouse. From the ancient images of "nezumi," which live around humans and are frequently sighted, I assumed that this word means "rat." More recently, however, a piece of news reported that numerous harvest mice or "nezumi" inhabited an empty building; hence, I am now unsure of the exact meaning of the word "nezumi." It is unwise to talk about the past year at the dawn of a new year; nevertheless, as if the forthcoming year of the "mouse" was celebrated in advance, the Nobel Prize in Medicine was awarded to Dr. Martin Evans in the UK and Dr. Oliver Smithies and Dr. Mario Capecchi in the US for the development of technologies related to knockout mice.

The Nobel Prize is announced in October every year. As the announcement date approaches every year, I would be contacted by the news media for my cell phone number in case they needed to contact me for comments. I was slightly tired of waiting but nevertheless, it was a joyous event. Since the announcement is only 3 months before the end of the year, I would be unable to bask in the afterglow of the announcement due to the end-of-the-year rush.



I wish that the Nobel Prize would be announced around April, although that would be unlikely because it appears that people in Europe and the US prefer to have the announcement before Christmas. In any case, knockout mice were constructed for the first time in 1989 using the homologous recombination method. Subsequently, this method was continuously proven to be so useful that by the year 2000, it was not surprising if this achievement was awarded the Nobel Prize in Medicine. Although it appeared that there were too many candidates for this award, the abovementioned 3 people became Nobel laureates as predicted by rumors.

Dr. Martin Evans successfully established embryonic stem (ES) cells from blastocysts and published an article in Nature in July 1981. I met Dr. Evans at the Asian Molecular Biology Organization (AMBO) workshop organized in Beijing, China, in June 1987 (Fig. 1). He indeed had a stately aura as a professor at the distinguished Cambridge University, and he created a somber atmosphere that reflected the history of the university. To explain the historical background of the establishment of ES cells, we have to trace back to the development of chimeric mice using embryonal carcinoma (EC) cells derived from teratocarcinoma. Although Dr. Mintz retried and succeeded, the development of mutant mice using EC cells has disappeared since mutations were not transmitted to germ cells, and the supply of EC cells have been ceased.

Fig.1.
Dr. Evans (left) and Dr. Yamamura (right) in Beijing. 1987.06

Dr. Evans et al. published their achievement in December 1981; this was also when Dr. Gail Martin in the US published an article regarding the establishment of ES cells in the Proceedings of the National Academy of Sciences of the United States of America. The designation of ES cells is particularly interesting. Dr. Evans et al. originally termed the cells as EK cells after Evans and Kaufman, the developers; whereas Dr. Martin et al. termed them embryonic stem (ES) cells, which became a widely accepted term. Although Dr. Martin could not enter his name as one of the Nobel Prize awardees, I suppose his contribution will be remembered as a godparent of ES cells.

↳To the next page

Dr. Mario Capecchi is famous for the development of homologous recombination methods using ES cells, particularly the positive-negative selection method published in Nature in November 1988. He started the research in homologous recombination in the year 1980 and published an article in the November issue of Cell that year stating that the cells could be transformed by microinjection of DNA. However, although he had applied for the research fund, his application was rejected with the reason that it would be impossible. Nevertheless, he had a strong conviction and continued his research. When he finally succeeded, the referees commented that he was right in not listening to their suggestions. This is a typical example of innovative research that does not see the light of day soon but is realized after persistent endeavor. Dr. Capecchi is someone whose opinion I would like to obtain regarding a current trend that people tend to seek short-term achievements. He appears to be difficult to approach at first glance, but in fact, he is an extremely warm-hearted person with integrity. I still remember a story I heard when I visited his laboratory at the University of Utah on January 12, 1990. When Dr. Capecchi introduces homologous recombination vectors into ES cells, he turns on the electroporator by himself (Fig. 2). Although most people are cynical about this, I also have the same experience. Once, I was strongly willing the DNA to go into the genome when I injected the DNA solution into the pronucleus of a fertilized egg and the result showed an inexplicable increase in efficiency.

Fig. 2.
Dr. Cappechi (front right)
Dr. Yamamura (back left)
1990.01.12

Dr. Oliver Smithies is the first person to have successfully performed homologous recombination by using somatic cells, and his article was published in Nature in September 1985. He is good at developing technologies, and he has invented starch gel electrophoresis. Since his wife is Japanese and also a researcher, we invited the couple to the Symposium in Medicine and Biology in Kumamoto, Japan, in November 1993 (Fig. 3). He has an extremely friendly disposition, is uninterested in politics and is a pure scientist who loves to experiment.

Fig.3. Dr. Smithies
1993.11.20

Mouse resources will not be discussed without mentioning the achievements of these people (continued in the next issue).

※Pictures were provided by Dr. Yamamura.

A Request to Researchers

We have a request to researchers who uses our bioresources for their research. Please include information of the resources in Materials & Methods or Acknowledgement when you publish your research journals. In addition, please contact the source of your resources.

NBRP has opened a registration website for research journals. You can easily submit your information at the address provided below.

http://rrc.nbrp.jp/

Editor's Note: I guess that many affiliates of bioresources have felt that this field, considered to be a unspectacular discipline, has attracted long-awaited attention by the news of the Nobel Prize in Medicine awarded to 3 researchers who have developed technologies related to knockout mice last year. Dr. Yamamura, who was born in the year of the mouse, provided a fascinating topic of "Mouse resources and the Nobel Prize", in correlation to this year's Chinese zodiac. Please look forward to the sequel of this topic, which will be provided next month (Y.Y).

Hot News from Abroad No.22

Plant and Animal Genome XIV Conference

This time, I presented a poster entitled "New Approaches in Oryzabase: Gene Merge and Text Mining" to introduce new functions of Oryzabase(http://www.shigen.nig.ac.jp/rice/oryzabase/) The poster presentation site was moved to a newly constructed "Grand Exhibit Hall" with increased lighting. I felt that the discussions and interactions among participants became far more active than it had been in past years. I explored the various workshops, poster presentations, and corporate exhibitions by focusing on the presentations of databases and software.

Among the databases, BioCyc (http://biocyc.org/), a database collection of EcoCyc, MetaCyc, and a database of microorganisms whose genomes have been sequenced attracted my attention. It appears that BioCyc also develops websites that specialize in each organism focusing on MetaCyc, which contains metabolic pathway data of various species. BioCyc also released AraCyc (http://www.arabidopsis.org/biocyc/) and RiceCyc (http://www.gramene.org/pathway/) by cooperating with TAIR and Gramene, respectively, in addition to LycoCyc and MedicCyc.

Among the software, I found that the Community Annotation Server (CAS) (http://cas.gmod.org/), which is a genome annotation package presented by GMOD, was interesting. This was developed by effectively combining Chado, a schema of contemporary biology; MediaWiki, originally developed for Wikipedia; and G-Browse, a genome browser. Although the software is still in the alpha version, its future development is promising. (Gaku KIMURA)

I participated in the PAG for the first time and presented a poster entitled "Shared Information of Biological Resources" regarding the NBRP (http://www.nbrp.jp/), BioResource World (BRW; http://resourcedb.nbrp.jp/), Research Resource Circulation (http://www.shigen.nig.ac.jp/rrc/), as well as Taxonomy Viewer (http://www.shigen.nig.ac.jp/taxonomyviewer/) and Goall Viewer (http://www.shigen.nig.ac.jp/goallviewer/viewer.html) as future perspectives. It was a good opportunity to introduce NBRP and BRW to the world. The poster presentation this year was conducted in a newly built hall, which was bright and had a lively atmosphere.

In addition, I attended the SSWAP workshop (http://sswap.info/index.jsp). SSWAP stands for Simple Semantic Web Architecture and Protocol. SSWAP can perform "meaningful searches" in terms of the resources provided by various websites. For example, if "mouse" is typed in the form and searched, website information related to "mouse" such as the Mammalian Gene Collection and PredBALB/c, a tool to predict peptides that bind with the MHCs of BALB/c strains of mice are generated in the results. Thus, I felt that these "meaningful searches" can help me find information that I have never noticed before and will broaden my horizons.

(Yuka TAKAHASHI)

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