

The Development of Laboratory Animal Science in China and Japan

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Thanks to Professor Tetsuo Kunieda for giving me such a chance to discuss something with you about the development of laboratory animal science in China and Japan.

Today, I am going to talk about three topics. The first is a brief introduction of my department, and the second is a brief introduction of the development of laboratory animal science in China, and the third is a comparison of the management of systems of laboratory animals between Japan and China.

1. A brief introduction of my department

I was working in Department of Laboratory Animal Science, Shanghai Medical University before I came here. Now this university is merged to Fudan University during my staying in Japan in May of this year. Fudan University is a famous university in China and also in the world, it being the number 3 in China. Before merging, Fudan University had no medical school. As you know, all the famous comprehensive universities in the world have their own medical school. The merging benefits both for cross-linking medicine with other specialties and saving teaching resources. One more important thing is we can get more money from our government to improve the equipment and facilities.

My department is divided into 3 parts with about 50 staff members. The first is Section of Animal Production and Supply, and the second is Section of Teaching and Researching, and the third is Section of Administrative Office.

Section of Animal Production and Supply produces about 70,000 of mice and 20,000 of rats, and 300 of Beagle dogs every year. We have common used inbred and outbred strains of mice and rats. Apart from meeting the need of our university, we also sell them to other universities and institutes.

In order to produce higher quality of mice and rats, we reconstructed the facilities according to the national standards, and formulated the operating rules several

years ago. Now we have 800 m² of SPF rodent breeding rooms and 1,200 m² of dog rooms.

In the production system, we have core breeding colonies, which are raised in the isolators, and the production colonies, which are raised in the barrier system.

Last year we reconstructed animal experiment facilities which can hold more than 20 animal experiments at the same time. Meanwhile we trained the staff members and researchers and allowed them to observe the international rule of animal experiment. After a short practice, the researchers were very satisfied with both service and experiment results.

The second part is Section of Teaching and Researching. We have teaching courses of Laboratory Animal Science for both university students and postgraduate students. The full course is about 48 teaching hours, half of which is animal experiment skill practice. We edited the textbook titled Medical Laboratory Animal Science*.

We have postgraduate students who major in Laboratory Animal Science and we can also offer Master Degree to the postgraduate students who complete the Master degree course. By now 11 postgraduate students have graduated from our department.

Apart from teaching course, we have done some researches on laboratory animals. For example, we invented clean airflow apparatuses with high efficiency and low energy consuming, through which the air can be cleaned to reach grade 100 or 10,000 of American standard. These apparatuses can be installed in the SPF animal rooms.

We investigated natural infection of murine cytomegalovirus in the mouse colonies and found its infection was higher in the conventional colonies. The latent infection may be the cause of spread.

We studied on raising SPF Beagle dogs in large isolators through cesarean section and maintained for a long time.

We investigated epidemic hemorrhagic fever virus infection in rabbits, and found that rabbits could be naturally infected with this virus without any symptoms. It is unknown whether or not this infection comes from wild rats.

We are also conducting the comparative histology, because we found the same tissues from different species show slight differences in histology. This is very important for the researchers to identify which is normal and which is abnormal.

For the future development, a new science and technology building with laboratory animal center will be built within a few years. We should pay more attention to the facility to improve our experiment conditions. At that time, if possible I will invite some Japanese friends as advisors to participate in designing.

For the past 2 decades, a great progress has been made in the field of embryonic engineering and genetically modified animals. In medical research, we cannot study further without animal models, especially genetically modified animal models. So it is important for me as a university teacher to introduce these new progresses to the postgraduate students. Therefore we want to open a new teaching course called Embryonic Engineering and Embryonic Engineering Animals* which includes introduction of transgenic animals, knockout mice and nuclear transfer animals. We also want to establish a central laboratory for embryo manipulations. This is my purpose of coming to Japan.

2. A brief introduction of the development of laboratory animal science in China

About 25 years ago, we did not know what were laboratory animals, and why laboratory animals needed to live in such a good conditions and environments. We simply thought that the animals which could be used for experiments were called laboratory animals. But now things have been changed and people's ideas have been changed.

During the past two decades a great progress has been made in the field of laboratory animal science in China.

Now we have national and local associations for laboratory animal science. China Association for Laboratory Animal Science (called CALAS) was established in 1987; while some local associations, for example, Shanghai Association was established much earlier in 1979. Now almost all the provinces in China have their own association. These associations function as non-governmental academic information exchange and training animal technicians. Every 2 years these associations hold symposiums or conferences to

exchange papers or information. Many Japanese friends visited China and attended the symposiums during the past several years, through which the non-official exchanges in laboratory animal science between Japan and China have been developing.

We have two national and several local journals for laboratory animal science, which are sponsored by associations.

The development of laboratory animal science is under the leadership of our governments. The central government in charge is Ministry of Science and Technology, while the local governments in charge are Bureaus of Science and Technology. These governments function as making laws, acts, and standards, and drawing up development plans, and making budgets for laboratory animal science researches.

The management system of laboratory animals in China is through local Laboratory Animal Administrative Committees, which are composed of several laboratory animal specialists. The directors of the committees are officers. The basic levels are Laboratory Animal Administrative Committees of universities or institutes.

There are several national standards for laboratory animals, which were enacted by Ministry of Science and Technology several years ago, and now they are being reedited. For example, we have standard for laboratory animal microbiological quality control, which tells us what kinds of bacteria, viruses and parasites must be ruled out in conventional or SPF animals. According to local situations, some local governments also enacted local standards. For example, in Shanghai, we have standards for microbiological quality control of rhesus monkeys and dogs; in Jiangsu Province, there are standards for cages and racks, because almost all the cages and racks in China are made in Jiangsu Province.

There are two national breeding centers, which are sponsored by Ministry of Science and Technology. One is in Beijing, and the other is in Shanghai. They can provide breeds to institutes or universities nationally.

As for the facility, a lot of money has been used to construct and reconstruct the animal facilities to improve animal living and animal experiment condition. For example, in Shanghai, more than 90% of the medical institutes and universities have their own SPF breeding and animal experiment facilities.

Training is very important. There are several ways to train specialists and technicians. One is study abroad. One can apply for scholarship from WHO or Sasakawa, or China Scholarship Council, or occasionally from the universities and institutes. Of course you must pass the

examination or other qualifications. In some universities there is Laboratory Animal Science specialty for students. The animal keepers must be trained for a short course to be qualified for this work. Now almost all the animal facility leaders have graduated from universities of related specialties.

In 1990, Japanese government and Chinese government made an agreement to train Chinese Laboratory animal specialists and technicians in Beijing. This project was sponsored by Japan International Cooperation Agency (JICA). The courses covered all the aspects of laboratory animal science. From 1991 to 1996, about 520 students were trained through this project, some are playing active roles in this field. This is the largest international cooperation in laboratory animal science ever since in China.

As a result of the above measurements, the laboratory animal qualities have been greatly improved during the past several years.

3. A comparison of the management systems of laboratory animals between Japan and China

Since Japan and China have different social systems, so do the management systems. In Japan the government in charge is Ministry of Education, because all the universities and institutes are under the leadership of this ministry. While in China, the government in charge is Ministry of Science and Technology.

In Japan the management of development in laboratory animals is mainly non-governmental behavior. Japan Association for Laboratory Animal Science (JALAS) and other related associations play an important role. While in China this management is mainly governmental behavior, Laboratory Animal Administrative Committees (semiofficial) play an important role.

In China the construction and reconstruction of animal facilities must be inspected and licensed by authorities, while in Japan it needs not.

In China the licenses for producing and selling laboratory animals are needed and inspected every year by authorities, while in Japan it needs not.

In Japan the animal production and supply have been industrialized, while in China many universities and institutes raise and sell laboratory animals themselves. Few commercial animal companies (except for rabbits and dogs) are available.

In Japan most of the animal breeding and experiment facilities are SPF barrier system, while in China the development is uneven. The facilities in large cities, such as Beijing, Shanghai, and Guangzhou, are better

than those in remote areas.

In Japan the large animal companies conduct self-examination of microbiological control, and report to the customers every month, while in China this work is done by authorities once or twice a year. Few animal producers do self-examination by themselves periodically.

In Japan the microbiological monitoring menu for SPF rodents was issued by JALAS, which includes 9 kinds of bacteria, 4 kinds of viruses and 6 kinds of parasites. While in China this menu was issued by Ministry of Science and Technology as a national standard, which includes 13 kinds of bacteria, 11 kinds of viruses and 10 kind of parasites. I don't think it means the qualities of laboratory animals are better only by comparing the menus, it still needs a lot of work to do.

In Japan the university animal facilities function as central laboratories for animal experiments, serving the researchers, while in China most animal facilities still function as animal suppliers or sellers.

And the last, about the current development tendency, in Japan the development of laboratory animal science is closely associated with research projects, and focusing on the animal models, especially genetically modified models, while in China we are still focusing on the animal quality control. Few genetically modified animal models are made by ourselves.

Conclusion

From the above comparison, we can conclude that the development of laboratory animal science in Japan is well advanced, and non-governmental or self governing behavior plays an important role in the management of laboratory animals. The reasons for this may be associated with several points. One is that people from the top leaders to the researchers well understand the importance of laboratory animals; and the second is the spirits of cooperation and hard working of Japanese, and the third is the developed economy. You have money to do what you want to do, and to do things better.

China is a developing country, and the level of science and technology in general is still low. At the beginning, the development of laboratory animal science as a basis for biomedical science needs support from the governments. This is the reason why we have developed so rapidly.

Although a great progress has been made in the field of laboratory animal science during the past 2 decades, we still have a long way to go to catch up with the developed countries. The 10th five-year plan (2001-2005) in development of laboratory animals in China

aims at: legalization, standardization and industrialization. Legalization means we produce, sell, and use laboratory animals must be according to the laws or acts. Standardization means the animals we used and the animal facilities we used must be according with the national standards. And industrialization means the numbers, qualities, and costs of laboratory animals produced must be according to the market.

We need more information and techniques from developed country, and we are *seeking more* cooperation to prompt the development of laboratory animal science in China. I think the exchanges between Japan and China will benefit both of us.

Thank you!

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