The past to present animal use and current animal protection law in Taiwan

Hans Hsienchuan Chen

BitotechPath Consulting, Ltd.

Corresponding author: Hans HC Chen
BitotechPath Consulting, Ltd.
No.70-F3, Drive57, Lane12, Sec2, Yuenchiouyen Road, Nangang, Taipei 115, Taiwan
Phone: +(886)-2-2783-2557, hanschen36@yahoo.com

Abstract
"Humane Care of Laboratory Animals in Republic of China Annual Report", a source of official report regarding yearly use of laboratory animals for biomedical research has been published since 2004. It gives a general glimpse of concurrent condition of animals used under the guidance of "Animal Protection Law (Law)" in the running biomedical research on Taiwan. Further information regarding the past to present advancement of Lab animal science needed a brief illustration.

The animal use is well considered and supervised under the Law by Council of Agriculture (COA) recently. Such use probably began more than a century ago during the Japanese Imperial gubernatorial rule because of the need for disease control in this subtropical to tropical location and fairly underdeveloped island. Today, animal use is well considered and supervised under the Law implemented by the COA. Chapter 3 of the Law primarily considers the protection of all vertebrate animals. The lab animal welfare is thus under the Law that addresses four categories of mammals: 1) live stock animals for meat, milk and fur industry, 2) wild mammals, 3) pet animals, and 4) animals for show or entertaining purposes. Articles 15 and 16 in the chapter state that the highest authority for these issues is the COA which assembles yearly to a team of multi-disciplinary Members of the Animal Experimentation Ethics Committee. The Articles acknowledge the use of animals in scientific applications in accord with the principle of 3Rs; and they require the establishment of Institutional Animal Care and Use Committee (IACUC) for local institutional monitoring and regulating of animal experimentation. Today, a total of approximately 200 institutions and animal users, nation-wide, function under the guidance for animal experimentation since 2001. The official record on this shows slightly more than a million animals are used annually over the last three years (2003-5). Animal use oversight has strengthened with including the principal of 3Rs for animal use via IACUC system under the Law. These are successful stories and efforts, though improvements still lie ahead.

Keywords: Taiwan, animal use, Animal Protection Law, laboratory animal welfare

Foreword
Taiwan (Photo 1), a country and nation on an island across the Taiwan Straight from China, has developed from an underdeveloped world in 1896 beginning in the era under the Japanese Imperial gubernatorial rule, to the well-developed, wholly democratic country it is today, exemplified most recently by its desire to participate in the World Health Organization (WHO) on epidemiologic emerging diseases such as SARS, and World Animal Health Organization (OIE) concerning enzootic epidemiology such as avian influenza, and food and mouth disease. Taiwan has effectively contributed to epidemiologic and enzootic monitoring, and control of human and animal diseases that have enhanced global health. Many of these methods have relied on progress of lab animal science and alternatives to animal use in the life sciences for many decades. In recent years, the local society of lab animal science on this island --- the Chinese Society of Lab Animal Science (CSLAS/Taiwanese Association for Lab Animal Science; TALAS) and the National Laboratory Animal Center (NLAC) today along with the COA have become pivotal to the issue of animal welfare and to facilitating progress in the development of laboratory animal science on the island. We herewith try to illustrate this effort.

Animal welfare as a consideration in animal use advanced today on this island started just a little more than a decade ago in accordance with the promulgation of the Law in 1989 by the President of the Republic of China (TAIWAN), and today animal welfare is a key component. The gubernatorial COA
under Executive Yen pointed to implement the LAW. The Law consists of 40 articles that are divided into 6 chapters. The LAW gives protection of animals and animal rights to all kind of animals that include all vertebrae. The animal use and application in Taiwan therefore, may involve to not only laboratory animals but also pet animals, farm animals and wild animals including mammals, fishes, reptiles, and amphibian, no mater keeping them for pet purposes or raising them for biomedical application and agricultural studies, or for economic and entertaining purposes, and moreover, the animal rights for wild animals to survive in wild on ecology issue is concerned as well.

The past to present

The Animal Use ------ The present progress on alternatives and animal use in life sciences on the island can be summarized into 3 Stages: Early Days ---- Prior to around 1955, Developing Days ---- From 1955 to 1985, and Modern Days ---- From 1985 to present.

1. The Early Days

Animals used for medical research included rats, mice, guinea pigs, rabbits, and horses were primarily at Shilin Institute for Vaccine and Serum Production (now Taiwan Communication Disease Center; TCDC) and the Japanese Imperial University of Taihoku College of Medicine (now National Taiwan University College of Medicine, NTUCM). Animals used for domestic animal research included primarily cattle, fowls, rabbits, and swine especially, were used in Tanshui Institute for Livestock Vaccine and Serum Production (now Animal Health Research Institute, AHRI) and Institute of Livestock Research. The knowledge and techniques on animal use in medical research and domestic animal breeding were inherited from the Japanese Imperial gubernatorial rule starting from 1896 until to the end of World War II. Great contribution of animal use to medical research and preventative medicine on tropical diseases was conducted in the NTUCM and to animal infectious diseases, such as rinderpest eradication, hog cholera vaccine production for prevention conducted at AHRI. Paying respectful to animals sacrificed for research can still be visited as the Rinderpest Eradication Monument at AHRI.

2. The Developing Days

New concepts on laboratory animal science and medicine, especially management and use, were introduced to the Taiwanese through the U.S. Navy Medical Research Unit 2 (NAMRU-2) that was based in the National Taiwan University College of Medicine Teaching Hospital starting around late 1950. NAMRU-2 was established upon the requirement of tropical medicine research to the impending Vietnam War. Beside those animals in use, procurement of the wild resident Taiwanese monkeys ---- *Macaca cyclopis* was conducted at NAMRU-2 starting in the early 1960. The lab animal facility credential honor of the American Association for Accreditation of Lab Animal Care (now AAALACInternational) was granted to the NAMRU-2 in early 1970. In 1976, NAMRU-2 withdrew from Taiwan. The concept of barrier housing system or SPF barriers were introduced, but did not much with animal welfare, i.e., the 3Rs. Further introducing of nude mice was present approximately in 1978 at the TCDC and NTUCM, and at the newly established National Yangming University College of Medicine Laboratory Animal Facility followed thereafter. Modern animal management skills, way of breeding, lab animal medicinal knowledge and techniques were introduced in Taiwan subsequently in early 80’ though, accuracy, pertinent, and efficient did not meet international standards. Successful breeding of mini pigs with subsequent introduction of SPF pigs was established at the Animal Technology Institute of Taiwan (formerly the Pig Research Institute of Taiwan), National Taiwan University College of Agriculture Department of Animal Technology, and Taitoong Branch National Livestock Research Institute. Aquatic culture and fish disease research was conducted at the Toongang Branch National
Fishery Research Institute and was well performed.

3. The Modern Days

Laboratory animal science advanced to modern style comparable to international standards, with feverish effort beginning around 1985. Much effort was made by the founding of National Laboratory Animal Center (NLAC) in 1989 under the auspicious of the National Science Council (NSC), and the organized lab animal association --- TALAS) in 1987. These are the two drivers for charge the guidance of the highest authority of gubernatorial central government --- the COA with financial support from the NSC.

Our Efforts Today ----- The present effort and progress on alternative in life sciences, especially biomedical research is beginning nowadays on Taiwan. The efforts on animal welfares for animal use in life sciences and animal rights for wildlife ecology have been much progressed. These are itemized as follows:

3.1. The highest authority exerts the Law enacted since 1998

Laboratory animals are concerned in the Law Article 3, Item 3 for definition of "lab animal" as: Animal that bred, fed and kept for the purpose of scientific application. This is guided by the institute's Lab Animal Use and Care Panel (LAUCP) and IACUC: Article 16, Chapter 3 defines " those perform the scientific application of animals shall organize a LAUCP to supervise the scientific application of animal experimentation under the IACUC.

3.2. Modernized animal facilities established in affiliation with universities and institutions based on the meeting evaluation criteria of:

A. Barrier system for SPF animals and clear conventional animals.
B. Health and environment monitoring program.
C. Animal use are under the supervision of the IACUC and evaluated by the assessment visits of the multi-disciplinary teams of Members of the Experimental Animal Ethics Committee of the COA since 2002.
D. International visibility by the assessment visit of the AAALAC-International (AAAAC).

3.3. There are 10 major and key centers/facilities in Taiwan. Many are located in northern Taiwan. These 10 are:

A. National Lab Animal Center (AAALAC approved). The Center was a governmental created in 1889 but transformed into a nonprofit organization under the newly created semi-gubernatorial organization of National Applied Sciences Laboratories in 2003. A branch (Tainan Branch) was founded in southern Taiwan since 2004.
B. Development Center for Biotechnology (AAALAC approved). This was also a governmental founded in 1991 but transformed into a nonprofit organization under the Ministry of Economic Affairs with financial support since 2000.
C. National Defense University College of Medicine Lab Animal Facility (AAALAC approved)
D. Lab Animal Service Company (AAALAC approved). A private sector founded around 2000, assisted with technical support from Charles River Lab.
E. National Taiwan University College of Medicine Lab Animal Facility
F. National Chungkung University College of Medicine Lab Animal Facility
G. National Yangming University College of Medicine Lab Animal Facility
H. Buddha University College of Medicine Lab Animal Facility
I. National Research Institute of Infectious Diseases Control LB Animal Facility
J. Animal Health Research Institute Animal Drugs Inspection Branch Lab Animal Facility.

3.4. There are also four more animal facilities engaged in large scale animal experimentation for industrial research and development. These are private sector including Greenseasons Biotech Company, Level Biotechnology Inc., Kuokwang Serum and Vaccine Laboratory Ltd., and MDS Pharma Services.

4. Major breeders/venders/farms for supply of animal use:

A. Laboratory Animal Supply Company: SPF rats and mice in affiliation with Charles River Lab and Jackson Lab.
B. NLAC: SPF rats and mice.
C. National Taiwan University College of Medicine Lab Animal Facility: SPF rodents
D. National Chungkung University College of Medicine Lab Animal Facility: SPF rodents.
E. National Yangming University College of Life science Lab Animal Facility: SPF rodents.
F. BioVet Beagle Farm: Beagles
G. Animal Drugs Inspection Branch: SPF rabbits, SPF guinea pigs, and SPF eggs.

5. Humane Care of Laboratory Animals:

Annual report of 2005 for 200 of approximately 240 institutions and animal users indicated that these were assessed by IACUC. These results are itemized as:

A. Animal Facilities
   Of that, 56% were research institutions and medical centers, and 44% pharmaceutical/biotechnical institutions (Fig. 1).
B. Sizes of Animal Facilities
   Over 60% of lab animal facilities were small size. Of that 1/3 of facilities is "mini rooms" and
less than 1/2 larger than 170 m².

C. Animal Species and Numbers Used (Figure 3).
A total of roughly 1.2 million lab animals were used in the year of 2005. Colleges and non-profit research institutes increased the need of animal use but pharmaceuticals decreased.

D. Number of Animals Used by the Institute (Figure 4)
20% of the institutes used more than 5,000 animals/year.

E. The Sources Lab Animals Procured (Figure 5)
1/5 of the animals used were supplied by institutes themselves.

G. Meetings Being Held and Proposal for Animal Studies Reviewed by IACUCs (Table 1)
Of that, average of 1.9 meeting nation-wide in 2005 was noted. There were more meeting held in private sector companies.

H. Various Vertebrate and Animal Species Used (Table 2)
Ferret, a new species was introduced in comparison with 2004.

J. Numbers of Lab Animals Being Procured, Sacrificed and Kept Survival (Table 3)
In general, farm animals for agriculture research avoids final sacrifice following the study.
finished. Of the animals tested, 9.2% of animals died naturally in the animal facilities.

L. Guidebooks and Training Courses, Annual Convention, and Other Related Activities

6. Society Annual Meeting, Training Courses and Publications:
The society and association (CSLAS/TALAS) held annual meeting since the founding of the organization in 1989. There have been many training courses and lab animal related books sponsored by the society and NLAC. The society's official journal and/or representative periodical is undergoing for publication at the end of coming year.

Conclusion
This paper gives a brief introduction of animal use in the past and present in Taiwan of that the current animal affairs is strengthened by Animal Protection Law on an island across the Taiwan Straight from

Table 1. Performance of IACUC(I) numbers of meeting and protocol reviews according to the classification of institutes

<table>
<thead>
<tr>
<th>Institutes</th>
<th>No.</th>
<th>Meetings</th>
<th>Protocol Reviews</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>Approval</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Average</td>
<td>(%)</td>
</tr>
<tr>
<td>Universities/Colleges</td>
<td>65</td>
<td>117</td>
<td>1.8</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(46)</td>
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<tr>
<td>Industries</td>
<td>46</td>
<td>88</td>
<td>6.7</td>
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<tr>
<td></td>
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<td></td>
<td>(14)</td>
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<tr>
<td>Research Institutes</td>
<td>44</td>
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<td>2.3</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(15)</td>
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<tr>
<td>Hospitals</td>
<td>26</td>
<td>43</td>
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<tr>
<td>Miscellaneous</td>
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<td>Total</td>
<td>198</td>
<td>372</td>
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Table 2. Performance of IACUC(II): services and supervision

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<th>Items of Service</th>
<th>No.</th>
<th>1-5</th>
<th>6-10</th>
<th>11-20</th>
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<tr>
<td></td>
<td></td>
<td>(%)</td>
<td>(%)</td>
<td>(%)</td>
<td>(%)</td>
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<tr>
<td>Consultation on experimental design</td>
<td>69</td>
<td>53</td>
<td>7</td>
<td>3</td>
<td>6</td>
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<td></td>
<td></td>
<td>(19)</td>
<td>(77)</td>
<td>(10)</td>
<td>(4)</td>
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<tr>
<td>Suggestion on animal care</td>
<td>85</td>
<td>77</td>
<td>4</td>
<td>1</td>
<td>3</td>
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<tr>
<td></td>
<td></td>
<td>(24)</td>
<td>(91)</td>
<td>(5)</td>
<td>(1)</td>
</tr>
<tr>
<td>Inspection of animal facility</td>
<td>137</td>
<td>115</td>
<td>1</td>
<td>8</td>
<td>13</td>
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<td></td>
<td></td>
<td>38</td>
<td>84</td>
<td>1</td>
<td>6</td>
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<tr>
<td>Improvement of animal cares</td>
<td>62</td>
<td>56</td>
<td>1</td>
<td>3</td>
<td>2</td>
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<td></td>
<td></td>
<td>(17)</td>
<td>(90)</td>
<td>(2)</td>
<td>(5)</td>
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<td>Termination of animal experimentation</td>
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<td>5</td>
<td>1</td>
<td>0</td>
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</tr>
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<td></td>
<td></td>
<td>(2)</td>
<td>(83)</td>
<td>(17)</td>
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<tr>
<td>Total</td>
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<td>306</td>
<td>14</td>
<td>15</td>
<td>24</td>
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<tr>
<td></td>
<td></td>
<td>(85)</td>
<td>(4)</td>
<td>(4)</td>
<td>(7)</td>
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747
Hans Hsienchuan Chen

China. Taiwan has stood firmly and persevered in the past surviving as a country, nation, or state for Taiwanese identity in the past up to four centuries history of Han Chinese immigration to this island on that they mingled and bred with the original aboriginals for generation and generation. Today, these are particularly searching for international recognition as to "UN for Taiwan" for gaining representative to the world affairs. Our efforts to progress biomedical research in human beings (as for WHO) and animals (as for OIE) health related should be contributable and appraisable to the world around that need your whole concern, encourage and support.

Acknowledgements
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