

Current Understanding and Use of Environmental Enrichment in China

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INTRODUCTION

China's scientific research and development sector is currently the second largest in the world, and laboratory animals are widely used across a range of research fields. As China's biomedical and pharmaceutical industry has grown, a laboratory animal science community has developed which now has its own specialist professional society—the Chinese Association for Laboratory Animal Sciences (CALAS). The importance of animal welfare is increasingly acknowledged in China and the value of, and need to provide, environmental enrichment is being recognized by more and more scientists. This article

reflects on the current understanding and use of environmental enrichment within China.

Requirements for environmental enrichment in legislation

Effectively managing the use of laboratory animals in scientific research requires steps to be taken to ensure that animals do not experience any unnecessary harm, discomfort, fear, suffering or pain. As well as giving animals a clean and comfortable living environment, along with adequate food and drinking water, animals must also be provided with the opportunities to engage in and display a normal range of natural behaviours. It is increasingly understood that enriching an animal's housing with appropriate nesting material, shelters, toys and social companions can help to provide a stimulating environment that meets the physical and psychological needs of animals. This is important for the quality of the science and for animal welfare, as well as for meeting the requirements of the law.

The *Guidelines on the Humane Treatment of Laboratory Animals* published by the Chinese Ministry of Science and

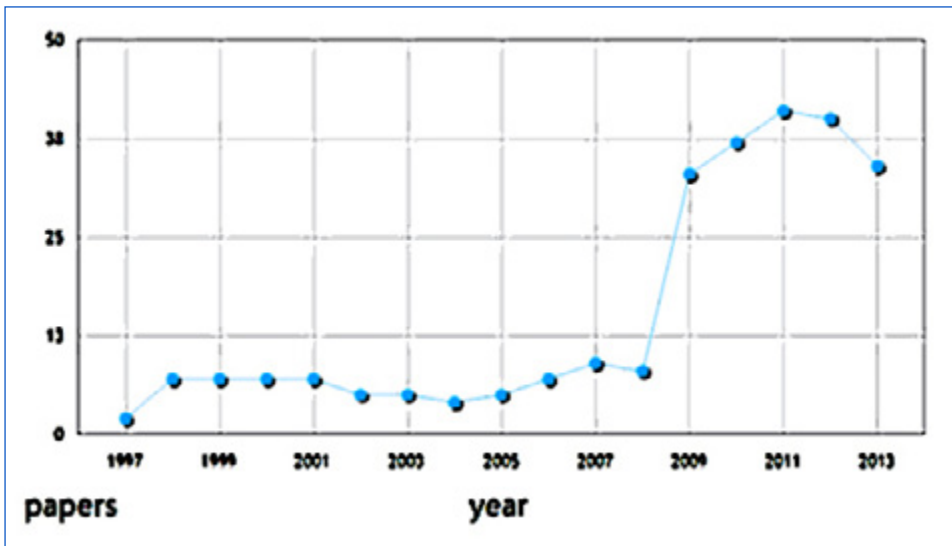
Technology (MOST 2006) set out national standards in a number of areas relating to the use and care of laboratory animals. Importantly, these regulations include the requirement for establishments to cater to animals' behavioural and physiological needs. Two aspects of the regulation are particularly relevant to this discussion on environmental enrichment. Between them, the ninth and tenth items set out minimum space requirements for all laboratory animals, state that animals must be able to express natural behaviours including the ability to stand-up, lie down, stretch, turn around and groom¹, and require that objects and devices should be placed inside the animals' housing which will enable them to engage in exercise and play behaviour. There are additional specific provisions for animals such as non-human primates, dogs and pigs.

Understanding and implementation of environmental enrichment

A search of the CNKI database² of scientific papers published

¹Pregnant or lactating animals should be provided with an additional 10% more than the normal minimum space requirement.

²This database (<http://www.cnki.net>) is similar to PubMed (www.ncbi.nlm.nih.gov/pubmed).



in Chinese shows an increase since 2008 in the number of mentions of 'environmental enrichment'.

In practice, consideration is given to providing most of the species used in research, testing and education with some level of environmental enrichment. However, although the current level of awareness and understanding about the benefits of environmental enrichment appears similar across different types of research establishments in China (e.g. private pharmaceutical companies, research institutes, government institutions), the actual ability for animal carers to provide appropriate enrichment is often limited by financial constraints or access to relevant information and resources. In addition,

whilst more and more scientists are acknowledging the importance of providing environmental enrichment and will direct the people caring for their animals to prepare appropriate enrichment items, there are many other scientists for whom environmental enrichment is still considered an 'optional extra'.

Medium to large-sized laboratory animals, including non-human primates, mini-pigs, dogs and rabbits are provided with enrichment more frequently than some smaller animals, such as fish. Around 50% of establishments currently provide environmental enrichment for larger animals.

In terms of what may be seen in those research establishments that do provide environmental enrichment for their animals,

rodents may receive nesting material, refuges and chew blocks, whilst hay and toys may be provided for guinea pigs and rabbits. Dogs and pigs may be allowed time to socialise with humans and given toys, and non-human primates may be given fruit, opportunities to climb and perch, mirrors and sometimes even music (see Table 1, page 10).

Sharing information about enrichment

There are five main ways that people in China currently find out about environmental enrichment and share experiences:

- The first is through the liaison that CALAS, its representatives and others in research establishments have with organizations such as AAALAC International³, AALAS, FELASA and others through which we find out and can pass on information, experiences or products relevant to environmental enrichment.

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³There are currently 36 laboratory animal institutes in China that are AAALAC-accredited and therefore required to follow the AAALAC International animal welfare standards. Commercial institutions account for 70% of this total, research institutes 15%, government agencies 9%, non-profit organisations 3% and hospitals 3%.

Table 1: examples of enrichment provided by some establishments

SPECIES	NATURAL BEHAVIOUR	ENRICHMENT
Mouse	Burrowing; hiding; gnawing; nest-building	Tunnel; refuge/shelter; chew block; wood chips; nesting material
Rat	Burrowing; hiding; gnawing; nest-building	Tunnel; refuge/shelter; chew block; wood chips; nesting material
Hamster	Burrowing; hiding; gnawing; nest-building	Tunnel; refuge/shelter; chew block; wood chips; nesting material
Guinea pig	Hiding; appropriate food for grazing; exercise	Refuge/shelter; hay; toys; pen housing
Rabbit	Hiding; appropriate food for grazing; exercise	Refuge/shelter; hay; toys; pen housing
Dog	Socialisation; lying; exercise	Shared exercise area and socialisation with other dogs and humans; rest area/bed; toys
Pig	Rooting; socialisation	Tyres; balls; exercise area
Non-human primate	Exercise; foraging; play	Apparatus to climb and perch on; fruit; mirror; music

- Secondly, more and more Chinese scientists working in laboratory animal science also now have experience of studying or working abroad—for example, in USA, UK, Germany, Canada and Japan. This provides exposure to what international colleagues in similar fields are doing, including how they provide environmental enrichment for the animals in their care. When scientists keep

in touch with these colleagues from other countries, they can continue to exchange this kind of information once they have returned to China.

- The internet is used, particularly by young scientists, to discover information on animal care and welfare, including enrichment.
- Scientists from China regularly attend international meetings on laboratory

animal science and animal welfare. They bring back information or products relevant to environmental enrichment.

- As China is a significant market for laboratory animal science, a number of companies are now established in the country that produce, market or promote environmental enrichment products.

CALAS initiatives

Representatives of CALAS liaise with a number of international organisations (in addition to those mentioned above) such as the UK Royal Society for the Prevention of Cruelty to Animals (RSPCA) and the International Fund for Animal Welfare (IFAW), and we also collaborate with scientific colleagues in USA, Canada, EU, Japan, South Korea, Singapore, Malaysia and Thailand. These relationships can include academic exchanges to share information on topics including animal welfare.

Through its activities and communications with its members, CALAS promotes the importance of animal welfare and provides knowledge and information on new initiatives on environmental enrichment and other factors relating to the care and welfare of animals. CALAS holds special training events throughout China (often in collaboration with international partners such as the RSPCA) and the CALAS Annual Meeting provides an important opportunity for exchanging information and the sharing of ideas for good practice. CALAS has been involved in the editing and publication of training and teaching resources, along with

chapters in relevant books for graduates, and has liaised with others, such as the RSPCA in the translation of animal care sheets (and a website resource promoting refinement). CALAS also publishes expert reviews and articles on animal welfare in national scientific journals, such as the *Journal of Comparative Medicine*.

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