

C04 Guidelines for Handling Laboratory Animals

1. Introduction

Animal experiments are frequently involved in a variety of scientific researches in the laboratories. Those who work with animals are exposed to a range of different hazards depending on the type of works undertaken. The objective of this safety guide is to protect laboratory personnel at the Science Park against possible hazards arising from the handling of laboratory animals, which are classified as vertebrates. Relevant legal requirements and ethical issues are also highlighted.

2. Hazards Associated with Animal Workers

The general hazards associated with the care and use of laboratory animals include:

- a) Physical harm – It includes bites, scratches and kicks associated with research animal contact.
- b) Needle-stick and sharps injuries – These are also common injuries arising from animal experimental procedures like injection using hypodermic needles, feeding, etc.
- c) Experimentally-induced infection – Laboratory animals may be deliberately inoculated with microorganisms for experimental works in the laboratory facilities. Animal workers might contract experimentally-induced infections via infectious materials during the course of handling or holding of the infected animals if protective measures such as the use of proper containment or personal protective equipment are not strictly followed.
- d) Zoonotic infections – Zoonotic diseases are infectious diseases that can be transmitted from animals to humans. Laboratory animal species potentially harbor a variety of zoonotic agents including viruses, bacteria, fungi, protozoa and parasites. Individuals with animal contact should be aware of these diseases and take appropriate precautionary measures to prevent infections.
- e) Allergens – Laboratory workers may show signs of allergies such as animal-induced asthma due to exposure to animals during their works with animals. Animal-induced asthma is the immune system's response to allergens including animal dander, scales, fur, body wastes and saliva, etc.
- f) Other hazards:
 - i. Ergonomic hazards caused by tasks that require repetitive motion, lifting, or awkward body postures.
 - ii. Slip, trip and fall hazards caused by various work processes, lighting requirements, housekeeping practices.
 - iii. Pressure vessel hazards related to compressed gas cylinders, autoclaves, high pressure washing equipment, etc.

C04 Guidelines for Handling Laboratory Animals

- iv. Electrical hazards related to the use of various electrical equipment.
- v. Machinery hazards include pinch, nip or crush points related to moving parts.
- vi. Noise hazards can result from animals, especially pigs and dogs, and from equipment such as cage washers.
- vii. Radiation hazards include ionizing and non-ionizing radiation sources such as radioactive substances, X-ray devices, MRI, laser equipment, ultra-violet germicidal lamps, etc.
- viii. Chemical hazards related to the use of disinfectant, anesthetic gases, pesticides, tissue preservatives and protocol-related use of chemicals.

3. Health and Safety Requirements

To assure the health and safety of laboratory animal workers and the compliance of relevant local legislations, the management of each concerned laboratory shall observe the following health and safety requirements:

3.1 Licensing and Ethics Approval

The use of living vertebrate animals for experiments in Hong Kong is regulated by the Animals (Control of Experiments) Ordinance (Cap 340, Laws of Hong Kong SAR). Animal workers must have valid licenses issued by the Department of Health for handling animals. They shall treat animals humanely in compliance with the Prevention of Cruelty to Animals Ordinance (Cap 169, Laws of Hong Kong SAR) and relevant code of practice. Respect the animals. Kill the animal with appropriate method such as carbon dioxide asphyxiation, cervical dislocation or induction of overdosed anesthesia. Ensure the animal has been sufficiently anesthetized or dead before carrying dissection.

In addition, clients intending to carry out experiments involving living vertebrate animals shall obtain approvals from relevant parties including individual client's Animal Ethics Committee.

3.2 Training of Personnel

All animal workers shall be trained and provided with information regarding standard work practices, potential hazards and their control measures as well as emergency procedures. Standard work practices shall include proper animal handling techniques, precautions for using hazardous substances, proper use of personal protective equipment and other safety devices for safeguarding animal workers.

C04 Guidelines for Handling Laboratory Animals

3.3 Personal Hygiene and Health Assessment

Personal hygiene is an important factor in protecting the health of personnel engaged in animal care or research. They need to understand and follow the hygiene practices that are to be taken routinely to protect them against zoonotic agents found naturally in experimental animals as well as the hazardous materials involved. These include:

- a) Wear proper personal protective equipment and clothing during work with animals. Dedicated clothing shall be either laundered by husbandry staff using in-house facilities or by professional laundry services. Dedicated clothing must not be taken home.
- b) No eating, drinking, smoking and application of cosmetics in the animal facilities or laboratories.
- c) Wash hands after handling animals, non-sterilized tissues or body fluids.
- d) Avoid working with animals if you are ill.
- e) Take additional precautions if you have open wounds by bandaging the area and wearing double gloves.

In addition, animal workers are recommended to have pre-employment and periodic health assessment or medical examination to determine if they are physically fit to work with specific animals and detect early signs of any diseases associated with that particular animal works. They should also maintain appropriate vaccination status depending on the animal species they are working with and upon physician's advice.

3.4 Facilities and Building Services Requirements

Animal facilities at the Science Park shall meet the following facilities and building services requirements in order to ensure a safe and suitable environment for animal care and use as well as necessary containment of the premises:

- a) The floors, ceilings, walls, benches and equipment in animal laboratories shall be designed to be easily cleaned and decontaminated.
- b) Proper ventilation shall be provided to ensure a suitable environment for the keeping of animals as well as to protect workers from airborne contaminants or odors arising from the handling of animals and operation of the facilities. In general, laboratories or areas for holding and handling animals should be maintained under negative pressure relative to the corridors or neighboring areas. 10 to 15 air changes per hour should also be provided to these areas.
- c) If animals are to be inoculated with microorganisms for experiments, all works associated with the infected animals as well as post-mortem examinations shall be carried out in special containment laboratories of suitable animal biosafety levels matching the corresponding risk groups of the microorganisms

C04 Guidelines for Handling Laboratory Animals

- involved. For more details on risk grouping of microorganisms, biosafety level classification for laboratories and the necessary biosafety equipment, please refer to the section “Laboratory Biological Safety Guidelines” of SHE Handbook.
- d) Essential facilities for animal holding including cage washer or other appropriate washing facilities, cage changing station or animal bedding disposal station, etc. shall be available in the premises.
 - e) In general, living animals are not allowed to be housed overnight in the laboratories unless the abovementioned facilities are in place. Exemption would be granted for the situation that animal experiments are in progress without washing or changing of cages.
 - f) Suitable area shall be provided for the temporary storage of clinical waste including animal carcasses, animal tissues, and animal-related waste materials (which may be contaminated with infectious agents). Relevant legal requirements shall be observed for their storage and final disposal.
 - g) Essential safety facilities including emergency shower, eyewash station, firefighting equipment, spill kit, and first-aid kit shall be available at appropriate locations. Autoclave, biosafety cabinets and other biosafety equipment should also be available depending on the biosafety level of the laboratories.

3.5 Safe Work Practices

Animal workers shall adopt the following health and safety practices for caring and handling of animals:

- a) Wear proper personal protective clothing and equipment (including spectacles / goggles, face shield, hair cover, gloves, respirator, mask, lab coat, coverall, shoe covers, etc.) and remove after animal contact or other operations.
- b) Exercise good personal hygiene practices.
- c) Use appropriate methods and equipment to restrain animals and prevent escape of animals.
- d) Perform animal manipulations within ventilated hoods or safety cabinets if necessary.
- e) Animal areas and cages should be cleaned and disinfected regularly.
- f) Use absorbent pads for bedding. If these are not available, use corncob bedding instead of sawdust bedding.
- g) Use ventilated enclosure such as cage changing station or animal bedding disposal station as far as possible for changing animal bedding.
- h) All sharp items including needles, scalpels, capillary tubes, etc. must be handled safely and placed in designated sharps containers for disposal.
- i) Do not recap needles.
- j) All animal carcasses, tissues or organs, shall be packaged in proper containers or bags and kept temporarily in deep freezers till picked up by licensed clinical

C04 Guidelines for Handling Laboratory Animals

waste collectors for final disposal. Animal-related waste materials possibly contaminated with infectious agents must also be disposed of as clinical waste. Packaging, storage and disposal of all the above-mentioned clinical waste shall follow the Waste Disposal (Clinical Waste)(General) Regulation (Cap 354, Laws of HKSAR).

- k) All post-mortems on infected animals shall be carried out under the physical containment conditions equivalent to the risk group of the microorganism present.
- l) Handle hazardous chemicals and drugs carefully following precautions recommended by the respective Material Safety Data Sheet (MSDS).
- m) Use anesthetic gases in ventilated enclosures or under well ventilated conditions. Suitable scavenging systems shall also be employed to remove the excessive or waste gases.
- n) Operations involving the use of radiochemicals shall be carried out in designated areas or proper ventilated enclosures in compliance with legal requirements.
- o) Adopt necessary engineering control measures and exercise safety precautions when operating machinery or equipment associated with mechanical, electrical, radiation, high pressure and noise hazards.

3.6 Precautions for transportation of animals

If it is necessary to transport animals from the animal holding facilities or from one laboratory to the others within Science Park for experimental purposes, the following precautions must be observed:

- a) Only healthy animals are allowed to be transported within the Science Park area. Sick animals or animals treated with hazardous substances such as pathogens or radiochemicals should never be transported.
- b) Animals should be transported in covered or opaque cages, carriers, or container that are escape-proof, adequate in size, and made of materials that can be readily sanitized.
- c) These cages or transport devices should have solid bottoms or placed in secondary container to contain animal waste.
- d) Transportation of animals should be done in a direct and timely manner, avoiding public areas as much as possible.
- e) Use cargo lifts for transporting animals. If there is not any cargo lift in the building, use the passenger lift only when there are no other passengers.
- f) Clean and disinfect immediately any contamination of public areas with animal materials.
- g) People who are involved in transporting animals should have appropriate personal protective equipment readily available for use.

C04 Guidelines for Handling Laboratory Animals

- h) Wash hands thoroughly with soaps after each transportation.
- i) All devices for transporting animals should be sanitized between uses.

4. Security Issue

Research using animals is sensitive, and the design of these facilities requires a heightened awareness to the issues of security control to maintain confidentiality and to prevent unauthorized intrusions. Access control to animal facilities and use authorization for animal workers should be carefully considered.