Procedure: Safety in animal houses

Purpose

To outline the procedures around all staff and students working in animal houses and/or laboratories at ANU including responsibilities, quarantine, safe work practice, and health.

Procedure

1. These procedures are intended to cover all University staff and students who routinely have contact with laboratory animals in the course of their work. It comprises four parts.
   - Part 1. General Discussion
   - Part 2. Design of Animal Houses
   - Part 3 Avoidance of Zoonoses
   - Part 4 Avoidance of Laboratory Animal Allergy.

Note: The principles outlined in these procedures are equally applicable to the prevention of insect and plant protein allergies.

Part 1. General Discussion

2. General rules for laboratory safety apply equally to animal houses. Special attention, however should be given to the disposal of waste, decontamination of cages, the requirements for good ventilation, and manual handling requirements.

3. All animal houses should have:
   - Clear demarcation of restricted areas, including signposting, with controlled access to these restricted areas.
   - Emergency evacuation procedures. A trained first aid attendant available during working hours.
   - An induction program to show new staff and students correct animal handling techniques. Where possible, an animal technician who is experienced with the appropriate species should assist in all experimental procedures involving animals. Only when the research worker demonstrates ability to work with animals without damage or stress to the animal or self,
should they be left alone.

- Prohibition of smoking, eating, drinking or the application of cosmetics in the animal house.
- Waste removal and decontamination procedures.
- Regular training in manual handling techniques.
- Training and monitoring programs for cleaners to ensure compliance with regulations and safe working practice.
- Effective supervision of instituted protective measures, such as the wearing of protective clothing.
- Systems of work that allow for the separation of clean and dirty or dangerous procedures. Standard Operating Procedures should be compiled for each area and these should be explained to all newcomers. These SOPs should be written in consultation with other relevant officers such as the Radiation Safety Officer and the Animal Welfare Officer.
- A program for the regular maintenance of equipment. Separation between general work areas (such as desks or laboratory benches) and animal handling or animal rooms. Staff and students should be directed to leave the animal area to take extensive notes or to conduct activities which are not related to the animals.

Part 2. Design of Animal Houses

Ergonomics

4. Animal house work requires consistent manual handling effort and, therefore, all attempts should be made to reduce the risk of musculoskeletal injury.

5. Feed bags, cages and other items requiring repeated lifting should be stored at a height of 40–50 cm above the floor, to reduce extremes of effort.

6. The height of cage stacks should not exceed 1.6 m, so that overhead work and the drift of animal residues onto workers’ faces is minimised.

7. Sawdust should be removed from vehicles using a vacuum device and stored in gravity fed hoppers. Where the above procedure is not possible, sawdust should be moved using a long handled, wide scoop shovel. As dust can initiate its own respiratory distress, as well as exacerbate any existing animal allergy, respirators or air-fed helmets (see Part 4) should be worn at all times during sawdust handling. Where possible, sifted softwood sawdust (e.g. pine) should be used in
preference to hardwood type. There is a significantly higher incidence of respiratory and eye irritation using the latter.

Ventilation

8. A well designed ventilation system will provide sufficient air movement to supply oxygen and remove the products of respiration, dusts and fibres, thereby reducing the risk of allergy.

9. Animal houses require 100% exhaust of room air with no recirculation and at least 10–15 air changes per hour. Air movement should be evenly distributed throughout each room without draughts or dead spots. Noise levels should be minimal.

10. Where practicable, exhaust ducts should be at floor level where the concentration of animal residue is highest. The ducts must be made rodent-proof.

11. For most species, a relative humidity of 55–15% at 21–1°C is optimum. This level of humidity will also serve to reduce dust levels.

12. Work with animals involving volatile anaesthetics, particularly in an open system, should be done in a fume cupboard.

Part 3. Avoidance of Zoonoses

Introduction

13. Animals are susceptible to some of the infectious diseases experienced by humans. This susceptibility poses some problems for those working with animals. Employees and students need to be protected against these diseases; just as the animals need, for experimentation, to be free of extraneous contamination.

14. Animals can carry infectious agents without showing overt illness. Although the risk from purpose-bred colonies is small, care needs to be taken as some conditions can be activated by stress in the animals or the colony can be contaminated (by wild rodents, bedding material) or human infections can be passed onto the animal and then returned.

15. Dogs, cats or monkeys not bred in animal houses are a greater potential hazard, while animals caught in the wild are potentially the most hazardous of all in this regard.

Safe Working Practice

16. Medical or veterinary advice should be available to all persons handling animals, particularly simians. Generally, persons should only handle sedated simians.
17. All those in contact with animals should be immunised against tetanus and tuberculosis.

18. All staff and students should wear adequate protective clothing, by which is meant at a minimum: cotton-lined gloves (preferably Nitrile) and gown or overalls. Masks must be available at all times. Safety boots should be worn when dealing with large animals. All protective clothing should be removed before leaving the animal house and laundered or disposed of in a manner suited to the type of contamination and clothing.

19. Precautions should be taken in handling blood, tissues, and dead animals. Animal carcasses, dressings and organs that accrue from research work involving human pathogens should be securely packed and then incinerated by John Curtin School of Medical Research. Staff with cuts or broken skin which could permit entry of foreign material must ensure that they are adequately covered and protected.

20. Standard operating procedure for the treatment of wounds inflicted by bites or scratches, is to scrub the wound with copious soap and water and if possible induce bleeding. An antiseptic such as Cetrimide or 1% Cetavlon is to be applied and the wound covered by a sterile dressing. Medical advice may need to be sought in the case of a severe wound after first aid has been administered. The person bitten may need to be observed for three weeks by their medical practitioner if the animal is thought to be contaminated.

Quarantine

21. It is generally necessary to quarantine incoming stock, and to screen them for disease before combining with existing stock. In the case of simians, this quarantine period is of extreme importance as their similarity to humans means that many of the diseases carried are transmissible. Animals trapped in the wild should routinely be quarantined, pending a clinical and microbiological assessment.

Health Surveillance of Laboratory Animals

22. In research programs where animal health is critical (e.g. viral immunology) regular monitoring of animals for subclinical infection should occur. In physiological research, preventive veterinary programs should be implemented to ensure animals have a health status consistent with research needs and occupational health and safety requirements.

23. All animals dying unexpectedly should be autopsied by experienced and appropriately trained personnel. Animal sickness should be reported to the same
personnel.

Species-associated Zoonoses

24. Rodents and Rabbits
   - Salmonella
   - Lymphocytic choriomeningitis virus
   - Ringworm and dwarf tapeworm
   - Various forms of fungi
   - Sendai virus
   - Pseudotuberculosis
   - Leptospirosis
   - Glardia muris
   - Vaccinia (from experimental use)

   Cats
   - Toxoplasmosis. This is of particular concern to pregnant women because of its severe teratogenic potential. Pregnant women should not work in cat facilities. Women are to be warned if they are to work in cat facilities.

25. In a cat breeding unit, periodic testing of breeders for toxoplasmosis should be done and staff monitored annually for sero conversion.
   - Cat scratch fever
   - Ringworm
   - Toxocara cati, Toxascaris leonina (possibility of human visceral larval migrans)
   - Chlamidia psittaci
   - Pasteurella

26. Avians
   - Psittacosis
   - Salmonella
   - Newcastle disease virus
   - Aspergillus
   - Candida

27. Sheep
• Q fever
• Salmonella
• Anthrax

28. Cattle
• Brucellosis
• Leptospirosis
• Q fever
• Ringworm

29. Pigs
• Erysipelothrix
• Ringworm

30. Primates
• Herpes virus simiae (B virus)
• Hepatitis A
• Yaba virus
• Cytomegalo virus, which like poliomyelitis can be passed back from humans
• Tuberculosis
• Shigella
• Salmonella
• Giardia
• Balantidium coli
• Entamoeba histolytica

Part 4. Avoidance of Laboratory Animal Allergies

Distribution

31. Workers in contact with laboratory animals have frequent exposures to allergens in the form of hair, dander, urinary proteins, faeces and ectoparasites. In susceptible individuals this can lead to various degrees of Laboratory Animal Allergy (LAA), otherwise known as Hypersensitivity to Laboratory Animals (HLA).

32. LAA may lead to Occupational Asthma (OA) if the primary symptoms are ignored.
33. The development of OA is related primarily to the length of exposure. However it has been observed that those who have intermittent exposure to animals for short periods of time can develop severe symptoms quite rapidly. It is important for personnel to wear full protective clothing even during short period exposure.

Symptoms of LAA

34. Workers may exhibit one or several of the following symptoms:
   - Rhinitis (runny nose)
   - Conjunctival symptoms (itchy, red eyes)
   - Urticaria (itchy, raised skin rash)
   - Bronchial asthma
   - Other diffuse respiratory symptoms

Sources of LAA

35. After detailed studies it has now become clear that the major allergen causing LAA is urinary protein. The condition may be precipitated by urinary proteins and exacerbated by exposure to other allergens, such as hair, saliva, epithelia, serum, faeces and dander. Therefore, the need to control all sources is vital. Allergens are frequently transmitted on the hands (or gloves) Rubbing or scratching with unwashed or gloved hands seems to be a common way of applying allergens to the eyes, nose and skin.

Smoking and LAA

36. No relationship between smoking and the development of LAA has been established. Studies of smoking in allergic and nonallergic workers have not revealed differences in incidence and/or extent of LAA; however, smoking should be prohibited for hygiene purposes (see Part 1) and is prohibited in The Australian National University (Policy paper 30/1988: "Smoking in the University").

Prevention of LAA

37. It is virtually impossible to completely prevent the incidence of LAA, as some individuals may be highly sensitive. However the provision of the following should have a marked impact on the incidence and severity of LAA.
   - High standards of accommodation and ventilation
   - Suitable protective clothing
• Training and supervision
• Medical surveillance
• High standards of cleanliness and cleaning

**Accommodation**

38. Ventilation (see also Part 1). Where the ventilation is not ideal, the use of positive pressure isolators should be considered.

39. Stocking Densities. The prescription of stocking densities for animal houses has been somewhat controversial, since many factors, including cage size and method of husbandry, will determine acceptable limits. Other relevant factors are the efficiency of air exchanges, behavioural characteristics of the animals and their need for space, as well as the schedule for cleaning and management of animal house hygiene.

**Protective Clothing**

40. Long sleeve gloves, overalls, protective waterproof aprons, and waterproof footwear should be worn while washing cages. At other times gowns/overalls are a minimum requirement. When using gowns in animal houses attention should be given to the necessity to adequately cover underlying clothing.

41. Eye wear and masks should always be available for worker use if required. Masks (particularly those that are charcoal impregnated and effective against respirable dust) offer some degree of protection to the intolerant person, but may be inadequate if the challenge is high or the person has become sensitised.

42. Air-fed helmets may be indicated for severe cases of LAA, or where ventilation is inadequate. These helmets are valuable when the allergic person is unable or unwilling to seek redeployment, as the helmet with its filtered air, may allow the symptoms to abate to a controllable level.

43. All protective apparel should be supplied on the basis of long term personal loan and sufficient sets should be provided to allow daily laundering.

44. It is to be remembered that protective apparel is only a supplement to good environmental control and should not be used as an alternative.

**Cleaning Procedures**

45. Ideally, cleaning should be done using suitable industrial vacuum cleaners. Other methods include emptying of cages into bulk collection chutes and bins. The cage should always be emptied in close proximity to the chute or bin to minimise circulation of dust and animal debris.
Training and Supervision (see Part 1)

Medical Surveillance

46. Staff who are at risk of LAA may wish to undertake appropriate diagnostic tests although these are not always predictive of the degree of reaction.

47. Positive responses to the above tests should alert both the examining medical officer and supervisor to the need for diligence in the use of precautionary measures and for close medical surveillance.

48. Early reporting of symptoms is to be encouraged and referral to a suitably qualified medical practitioner should be considered. If in doubt contact the Occupational Health and Safety Unit.

Wet Handling Methods

49. In order to reduce the amount of airborne dust, a fine water mist should be used to dampen the bottoms of cages only, prior to removal for cleaning purposes. This method is not to be used routinely for dust suppression as the damp encourages mould. If in doubt, check with the Animal Welfare Adviser, John Curtin School of Medical Research.

Management of LAA

50. If a staff member or student displays symptoms of LAA, redeployment is recommended as the first resort, until symptoms recede. If redeployment is undesirable or impractical, scrupulous attention needs to be given to the wearing of air fed helmets, full protective clothing, and to personal hygiene. To prevent relapse, these measures need to be instituted when person re-enters the animal house after redeployment.

51. In cases where asthma has become a feature of LAA, medical advice is mandatory. The person may need to be treated with anti-spasmodics and/or immunosuppressants. Research indicates however that this form of treatment is not uniformly successful.