

# What You Should Know About Health Risks When Working With Laboratory Animals

## Hazard Overview

Generally, hazards faced by working in the laboratory animal facility are similar to those seen in other types of laboratories. These are briefly listed in Table 1.

**Table 1.** General Hazards in Animal Facilities

| Potential Risk of                  | Due to                                    | Examples  |
|------------------------------------|---|---|
| Musculoskeletal (Back) Injury      | Lifting<br>Pushing<br>Twisting<br>Falling | feed bags<br>cage racks<br>restraining large animals<br>slipping on wet a floor |
| Hearing Loss                       | Noise                                     | cage wash areas, dog runs   |
| Electrical Shock                   | Faulty electrical wiring                  | water on floor, ungrounded equipment  |
| Wounds or Smashed Fingers and Toes | Sharp edges and heavy objects             | caging equipment  |
| Burns                              | Steam or hot water                        | autoclaves and cage washing equipment   |

Care must be exercised to help avoid the hazards listed in Table 1. The safety discussions supplied during initial orientation and the laboratory safety training conducted by Health and Safety are helpful in this regard. The noise levels found in the cage washer room are not immediately dangerous to hearing; however, the levels are loud enough that efforts to reduce exposure (hearing protectors) are recommended if working in the area for long periods. The caging equipment is heavy; once in motion, it can be difficult to stop. It is important to keep finger and toes from becoming trapped between moving equipment and other objects such as doorways and other cage racks. Steel-toed shoes are recommended. Burn injuries have occurred in the animal facility. Both the cage washers and the autoclaves use high temperatures during operation and the steam or objects coming out of them are hot enough to cause injury.

Working directly with animals and in animal rooms creates additional hazard risks that are not usually seen elsewhere. Some examples are listed in Table 2.

**Table 2.** Special Hazards in Animal Facilities

| Potential Risk of | Due to          | Examples   |
|-------------------|-----------------|--|
| Fight Wounds      | Bite or scratch | improperly handled animal  |
| Needle Stick      | Syringe use     | improper sharps handling and disposal  |
| Exposure          | Allergens       | animal hair, dander, serum, animal proteins  |
|                   | Radiation       | research isotopes, x-ray equipment   |
|                   | Chemicals       | hazardous materials on test, cleaning or decontaminating materials, acids for cage washers |
|                   | Biohazards      | human pathogens, zoonotic pathogens  |

Each of these hazards is briefly discussed below.

**Fight Wounds:** Animals bite and scratch. This is particularly likely when they are in pain or feel insecure. Wounds caused by non-human primates present special concerns and are dealt with separately. If injured, immediately secure the animal if possible. Typically, the physical damage done by laboratory rodents and rabbits is minimal; however, resultant infections are common and can be severe. Bites from animals other than mice frequently strike bone. Medical attention is recommended and a report of the wound is required (see Report of Animal Bites S-08-023). Immediately, thorough washing with warm water and soap, preferably a disinfectant soap, is recommended to lessen the chance of infection.

Proper handling will greatly reduce the chances of injury. Handling is covered in the IACUC training tapes; these are available for review during normal business hours in the Lab Animal Facilities. Additional hands-on training can be made available via a request of the lab animal management staff.

**Needle Sticks:** Hypodermic needles are common sources of injury. They are very sharp and readily penetrate skin. In the research environment, they are often contaminated with hazardous materials or infectious agents (either as research material or from the animal) and readily transmit these things via needle sticks.

Effective animal restraint helps to lessen the risk. Safety syringes with integral protective sheaths are available. Careful planning to always have a sharps disposal container in the work area is highly effective in reducing the risk of injury (see HM-08-020).

**Exposure to Allergens:** This is the overwhelmingly most prevalent occupational health risk to laboratory animal workers. Numerous studies have shown problems in 20-30% of all persons with exposure and approximately 10% of those develop asthmatic symptoms. The problem can be debilitating and career-ending and should not be underestimated.

Allergies can be manifest in a number of ways, including: allergic rhinitis (a condition characterized by runny nose and sneezing similar to hay fever); by allergic conjunctivitis (irritation and tearing of the eyes); or by atopic dermatitis (a skin redness and swelling caused by contact). Asthma (tightness in chest and restricted ability to breathe) can also develop. Symptoms can develop anywhere from months to years after a person begins working with animals. A majority of the individuals who are going to develop symptoms will do so within the first year. People who have a prior personal history or family history of hay fever, or eczema will be more likely to develop asthma after contact with animals. These people do not seem any more likely to develop rhinitis and conjunctivitis than do those without such personal or family history.

People frequently believe that their allergy is to animal hair or dander (shed skin) but recent studies show that the offending material is proteins from animal urine, saliva, and feces. Exposure may occur either through direct contact or, more commonly, by inhaling dust from the bottom of a cage that has been contaminated with urine or fecal material. This dust is usually invisible and, while worse during cage cleaning, is always present in the animal room air.

Procedures should be routinely followed to prevent the development of animal allergies. Workers should wear gloves to prevent direct exposure. In order to prevent inhaling contaminated material, masks may be worn. This is particularly valuable during the changing of cages. Respirators, either fit tested with HEPA filters or disposable (e.g. N-95) "masks", are more effective than surgical masks for limiting respiratory exposure. Use of a respirator or a cage dumping station is required when dirty bedding is removed from cages.

It is particularly important to seek medical advice regarding animal allergies if symptoms include difficulty breathing, tightness in the throat or chest and shortness of breath.

**Exposure to Radiation:** Radiation hazards are minimized through management controls. Protocols utilizing radioactive materials are developed with the assistance of Radiation Safety and procedures are formulated to protect workers. Training in and following these procedures are important to minimize risks.

**Exposure to Chemicals:** Chemical hazards due to experimentation with chemicals are minimized through management controls. Protocols utilizing chemical agents are developed with the assistance of the Academic Chemical Hazards Committee (ACHC) and procedures are formulated to protect workers. Training in and following these procedures are important

to minimizing risks. Similarly, safe handling of the chemicals used in the cleaning and disinfection functions of lab animal procedures rely upon training in and subsequent adherence to proper use procedures.

**Exposure to Biohazards:** Biohazards due to experimentation with infectious agents are minimized through management controls. Protocols utilizing infectious agents are developed with the assistance of the Institutional Biosafety Committee (IBC) and procedures are formulated to protect workers. Training in and following these procedures are important to minimizing risks.

Biohazards are also created by zoonotic diseases. These are infectious agents carried by animals that cause disease in humans. Zoonotic disease risk from **typical laboratory animals** bred specifically for research is small. Infection is most likely to arise from "Rat Bite Fever" but Lymphocytic Choriomeningitis virus infection may also occur. Other infections would be very unlikely. The infection risk from research animals that are **not bred specifically for research and non-human primates**, in particular, is quite real and can be deadly. Rabies, Q Fever, Herpes B Virus, Tuberculosis, Toxoplasmosis, Leptospirosis, Cryptosporidiosis, Psitticosis, Hantavirus and Ebola virus are examples of real and serious threats. A more comprehensive list of zoonotic agents is given in Table 3. Further information materials are available and supplied to persons with higher risks for exposure to these agents.

**Personal Hygiene:** There are a number of personal hygiene issues that apply to all workers who are exposed to animals.

- a. There should be no eating, drinking, smoking or applying of cosmetics in areas where animals are housed or used.
- b. Laboratory coats should be worn over street clothes when working with animals. This will minimize the contamination of street clothing. Laboratory clothes should be left in the lab and should not be worn when eating or in public eating areas. Laboratory clothing should be laundered routinely.
- c. Careful hand washing should be done after handling of animals and prior to leaving the laboratory.
- d. All work surfaces should be decontaminated daily and after any spill of animal related material.
- e. Certain infections are transmitted from animals to humans primarily by the animal's feces or urine contaminating one's hands that may contaminate objects put into the mouth. Examples of organisms utilizing this mode of transmission are species of *Salmonella*, *Leptospira* and *Entamoeba*. Every precaution should be taken to avoid this mode of transmission by alertness and careful personal hygiene. Additional health problems are encountered when these organisms are carried home and children/family members are exposed.

## Table 3: Some Zoonoses by Animal Species

### Non-Human Primates

Campylobacter jejuni  
Cytomegalovirus  
Ebola spp  
Entamoeba histolytica (Amebiasis)  
Hepatitis A, B, C, D, E  
Herpes B virus  
Herpes platyrrhinae  
Leprosy  
Marburg  
Measles  
Monkey Pox  
Mycobacterium tuberculosis  
Rubella  
Salmonella spp  
Shigella spp  
SIV  
Tanapox (Benign Epidermal Monkey Pox)  
Yabapox virus

### Farm Animals

Ascaris  
Bacillus anthracis  
Balantidiasis coli (swine)  
Bovine papular stomatitis  
Brucella spp  
Capripoxvirus (sheep and goats)  
Chlamydia psittaci  
Coxiella burnetii (Q Fever)  
Cryptosporidia  
E. coli (multiple strains)  
Echinococcus granulosus (int. host) - Cystic E. multilocularis thru dog – and Alveolar Ehrlichia equi (serology)  
Erysipelothrix rhusiopathiae  
Hydatid Disease (thru dog)  
Influenza  
Leptospira spp  
Listeria spp (serology and culture)  
Mycobacterium bovis  
Orf (Parapox)  
Pseudocowpox  
Rabies  
Salmonella spp (especially MDR S. typhimurium DT104)  
Staph aureus  
Vesicular stomatitis

### Felines

Ancylostoma braziliense – hookworm  
Bartonella henselae  
Cat pox (Cow pox)  
Chlamydia psittaci  
Coxiella burnetii  
Echinococcus multilocularis – Alveolar Hydatid Disease, more rare. (fox, coyote, dog, cat, other wild carnivores definitive hosts. Rodents: e.g. voles and lemming and mice intermediate host).  
Toxocara cati  
Toxoplasma gondii  
Rabies

## **Canine**

*Ancylostoma caninum*, *A. braziliense* - hookworm– cutaneous migrans in humans

*Brucella canis*

*Campylobacter* spp

*Campylobacter jejuni*

*Echinococcus multilocularis* – Alveolar Hydatid Disease (fox, coyote, dog, cat, & other wild carnivores definitive hosts. Rodents: e.g. voles and lemming and mice intermediate host). More rare.

*Echinococcus granulosus* – Cystic Hydatid Disease (wolf, coyote, dog, & fox are definitive hosts. Sheep, cattle, goats, horse, pigs, etc. intermediate hosts)

*Giardia* spp

Leptospirosis

Rabies

*Salmonella* spp

*Toxocara canis* – visceral and ocular larval migrans

## **Canines and Felines**

Bites: many pathogens that need cultures from bite site or blood culture

*Ancylostoma* spp (helminth)

*Notoedres cati* (mite)

## **Rodents**

*Echinococcus granulosus* (wild rodents/voles)

*Francisella tularensis* (serology)

*Leptospira* spp

Lymphocytic Choriomeningitis Virus

Hantaviruses (Sin Nombre Virus)

*Spirillum minor* (Rat bite fever)

*Streptobacillus moniliformis*

*Yersinia pestis*

*Yersinia pseudotuberculosis*

## **Rabbits**

*Coxiella burnetii* (Q Fever)

*Notoedres cati* (mite)

*Francisella tularensis*

## **Ferrets**

*Chlamydia psittaci*

## **Aquatic Life**

Cryptosporidia

*Erysipelothrix rhusiopathiae*

*Mycobacterium marinum*

## **General**

Ascarids  
Campylobacter jejuni  
Clostridium tetani  
Dermatophytosis (fungal culture)  
Erysipelothrix rhusiopathiae (biopsy and culture)  
Giardia spp  
Hookworms  
Helicobacter spp (possible but unlikely)  
Influenza  
Leptospira spp  
Mycobacterium avium-intracellulare  
Mycoplasma spp  
Rabies  
Sarcoptes scabiei  
Sporotrichosis  
Strongyloides  
Yersinia enterocolitica and pseudotuberculosis

## **Poultry/Avian**

Chlamydia psittaci  
Cryptosporidia  
Francisella tularensis  
Salmonella spp (esp. S. pullorum)  
Staphylococcus aureus (esp. from handling infected eggs)  
Mycobacterium avium  
Newcastle disease  
Yersinia pseudotuberculosis

## **Wildlife (in addition to most other diseases in domestic animals)**

Baylisascaris procyonis (serologic)  
Borrelia spp (relapsing fever from ticks/lice) - not including Lyme  
Chlamydia psittaci  
Echinococcus granulosus – Cystic Hydatid Disease (wolf, coyote, dog, & fox are definitive hosts. Sheep, cattle, goats, horse, pigs, etc<sup>1/4</sup>intermediae hosts)  
Echinococcus multilocularis – Alveolar Hydatid Disease (fox, coyote, dog, cat, & other wild carnivores definitive hosts. Rodents: e.g. voles and lemming and mice intermediate host)  
Ehrlichia spp (E. chaffeensis)  
Encephalitis virus (California, EEE, St. Louis, WEE)  
Francisella tularensis  
Rabies  
Rickettsia rickettsii

## **Amphibians**

Chlamydia psittaci (?)  
Mycobacterium marinum, M. ranee, M. xenopi  
Various bacterial agents

## **Reptiles**

Cryptosporidia  
Salmonella