



Ask the Experts—Laboratory Animal Dander Allergy

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Do you have a biosafety question and you're not sure whom to ask? Send your questions to the "Ask the Experts" column and I'll get them answered for you. Drawing from my own experience or that of other experts in the field, we'll try to compile a thorough and comprehensive answer to your question. Please e-mail your questions to jkeene@biohaztec.com or to the Editor, Ira F. Salkin, at irasalkin@aol.com.

Question:

Recent Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC) inspections around the country have emphasized the concern for potential exposure to laboratory animal dander and the resultant allergic reactions of animal caretakers as well as researchers and ancillary personnel. How can we, most efficiently, minimize the potential for development of Laboratory Animal Dander Allergy (LADA)?

Answer:

Historically, LADA has been recognized as a significant problem for any facility that must handle laboratory animals. In studies (Bland, 1986; Bush, 1998; Seward, 1999) allergic responses ranging from mild respiratory distress to asthmatic reactions were shown to occur in 20%-33% of exposed individuals. Several factors, such as existing allergy to pets (dogs and cats), smoking, atopy and level of exposure

(Hollander, 1996, 1997; Krakowiak, 1996; Venables, 1988) have been shown to contribute to the development of LADA.

To minimize LADA the problem has to be tackled on several fronts. These include recognition of susceptible personnel, proactive occupational health programs, training of personnel, engineering controls, personnel protective equipment, and management commitment. Each of these is reviewed below.

Recognition of Susceptible Personnel

Obviously, all personnel who work with animals, particularly rodents, are at some risk of developing an occupational allergy. However, as mentioned above, studies have shown that those persons with existing allergy to household pets and other predisposing conditions, may be at increased risk. An initial, preplacement questionnaire regarding personal health conditions and allergies is critical to early identification of the personnel at risk of developing an occupational allergy. Such a questionnaire should be developed and administered by knowledgeable occupational health professionals. Those identified to be at increased risk by virtue of the preplacement questionnaire should be monitored by occupational health personnel on a periodic basis as determined by the occupational health physician.

Occupational Health Programs

Occupational health professionals must be aware of the potential for allergic responses among the animal care personnel and others, and must keep current with the medical treatment of such responses.

The occupational health program should include a database of persons working with animals, the type of materials they are exposed to, and information on any reported allergic reactions. The occupational health professional should counsel "at risk" personnel regarding their risk factors and the methods for minimizing allergies to animals.

Training

All personnel with potential exposure to laboratory animals must understand and recognize early allergic symptoms and be encouraged to report these symptoms to their supervisor and to the occupational health professional in a timely manner. In addition, personnel must be trained in the proper use of existing engineering controls and in the care and use of any personal protective equipment that is recommended or required. Since allergens can be present on the skin following the handling of laboratory animals, attention to personal hygiene, hand washing in particular, must also be stressed in training programs.

Engineering Controls

While AAALAC is generally concerned about the health and humane treatment of laboratory ani-

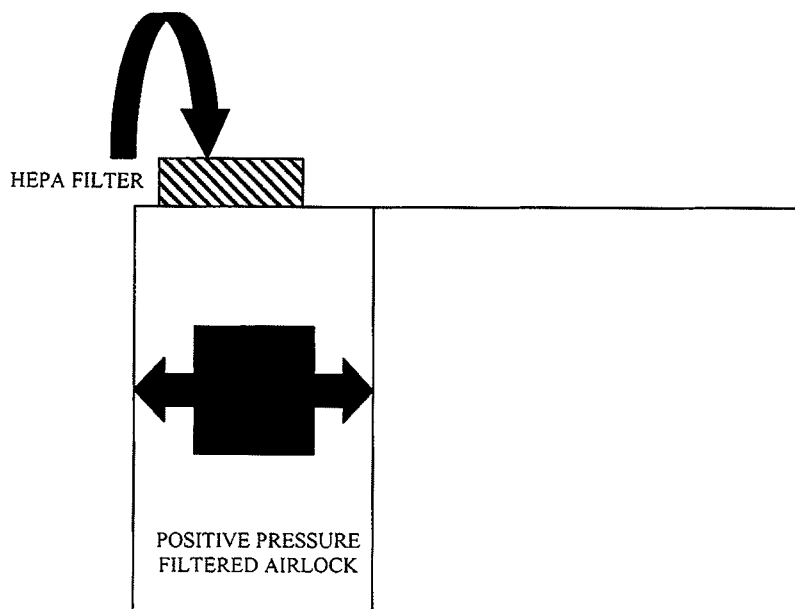
mals, their current emphasis on the potential exposure of animal care personnel to allergens sometimes creates a dichotomy with regard to the heating, ventilation, and air-conditioning (HVAC) systems within the animal facilities. Engineering controls are the first line of defense against potential allergen exposure and an evaluation of the current operation of the HVAC system of any animal facility should be a priority in minimizing the potential for allergic responses among facility staff.

The control of airflow in animal facilities has two purposes:

1. To protect animals from possible contamination and to provide a comfortable environment for the animals
2. To protect personnel both within the animal facility and outside of the facility from potential exposure to animal allergens

At first glance, these two purposes appear to be at odds, but there are ways to accomplish both at the same time. While it is evident that potentially contaminated materials should not be mixed with clean items, the concept of "clean" and "dirty" corridors separated from each other and the animal room by directional air flow and pressure differentials is not appropriate when potentially hazardous aerosols

Figure 1



(allergens, infectious agents, hazardous chemicals, chemotherapeutic agents) are generated in the animal rooms (Keene, 1984). HVAC systems for animal facilities should be configured so that the animal rooms are at negative pressure to the corridors at all times. Ventilated airlocks can be used as a mechanism to introduce HEPA-filtered air into animal rooms if necessary (Figure 1). Other possibilities also exist and the decision for a specific HVAC configuration should be made after careful consideration of the requirements for a particular facility.

Negative pressure HEPA-filtered cages for rodents can be used to protect the animals that may be immunocompromised and, at the same time, provide protection for animal caretakers and researchers from exposure to allergens. Care must be taken when choosing such caging systems since they may be appropriate for minimizing allergen release and protecting animals, but inappropriate for use as containment devices when the animals may be shedding infectious agents.

Increased exposure occurs when personnel are changing bedding and cleaning cages. A number of cage dumping stations are available that provide laminar flow, recirculating air. These cabinets insure a negative pressure as well as filtering the air before release to either the room or to the building exhaust. Class II Biosafety Cabinets also serve as protective devices to assure protection of animals, as well as eliminating the potential for exposure to respirable allergens.

Personal Protective Devices and Clothing

The care and use of personal protective equipment is also important in minimizing potential exposure to the animal allergens. Since allergens are present in dust, "dust/mist" masks may be all that is necessary for protection if appropriate engineering controls are in use. However, when there is a higher potential for sensitization of personnel with a predisposition for allergic response, as indicated by their preplacement medical questionnaire, these individuals would probably benefit from using HEPA-filtered, powered-air respirators. These personnel must also understand the need for proper cleaning of these devices following use to remove possible allergens.

Protective clothing, scrub suits, lab coats, gloves, etc. should be used to protect street clothes from possible contamination due to exposure to animal allergens. When leaving the animal facility, the protective clothing should be removed and left in the facility for laundering or disposal. Protective clothing should not, under any circumstances, be worn outside of the animal facility.

Management Commitment

Loss of funding as a result of a failure to be accredited by an accrediting agency such as AAALAC would be a serious consequence to any institution. Executive management must be aware of the potential for such action and must be committed to insure appropriate design and maintenance of animal facilities to protect both animals and personnel. Such commitment requires both financial and administrative support for facility and safety managers. Individual facility managers and principal investigators must understand the potential risks and be committed to enforcing the use of both engineering controls and personal protective equipment. The Institutional Animal Care and Use Committee is responsible for looking not only at the care and safety of the animals, but also at the potential for personnel safety problems resulting from the experimental protocols. This committee should exercise its authority to limit research projects if the institution or the individual scientist fails to protect personnel from exposure to hazardous materials, including animal allergens.

Summary

There is no single answer to the problem of protection of animal care personnel, researchers, or ancillary personnel against the development, or exacerbation, of allergic reactions to laboratory animals. The answer lies in a team approach to recognition of the problems at a particular facility and close attention to the basic tenants listed above.

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