



## Laboratory Animal Allergies & Asthma: Symptoms, Prevention, & Response

### Introduction

There are two million workers in the U.S. with jobs requiring constant handling of animals. One third of these workers have allergic symptoms, and 10% have occupational asthma caused by animal allergens.

This guide will review UMDNJ procedures to minimize the risk of occupational asthma and allergies for personnel who work with or in the vicinity of laboratory animals. “Personnel” includes faculty, staff, postdoctoral associates and students.

### Animal Allergens

Mice and rats are the most commonly used laboratory animals. These animals have several very potent protein allergens that are excreted in their urine. However, almost all species of common laboratory animals can trigger allergic reactions from allergens found in their dander, hair, feathers, feces, saliva, lacrimal (tear duct) secretions, blood, serum and plasma.

Personnel who regularly handle the animals are at the greatest risk of developing allergies. However, since allergens can become airborne on small particles or be carried on hair and clothing, people who do not directly work with animals may also be exposed.

### Risk Factors

There is a correlation between atopy (an inherited, familial tendency to develop allergy, such as hay fever, asthma, eczema) and the potential for developing laboratory animal allergies (LAA). There is a stronger positive correlation between atopy and development of asthma. Personnel handling animals or are indirectly exposed to animals or animal by-products should be included in a medical surveillance program that will help to identify atopic individuals.

- ♦ Smoking does not appear to increase the risk of developing LAA, but if a smoker does develop LAA, they are 1.5-3 times as likely to develop asthma.
- ♦ Males are more likely to be atopic than females (47% vs. 37%) and therefore more likely to develop LAA.
- ♦ There is a strong correlation between the intensity of exposure to the allergen, and the severity of symptoms. However, any allergen exposure, even very low levels, may trigger symptoms in allergic individuals.

### Symptoms of Animal Allergies

The earliest symptoms are usually nasal stuffiness, a “runny” nose, sneezing, red, irritated eyes, and sometimes rashes. Skin reactions include hives at the site of contact with animal urine or dander. Skin reactions may also be the result of a scratch. An itchy, reddened rash may occur under protective clothing as a result of a respiratory exposure to laboratory animal allergens. After a period of time (often several months, but occasionally many years), workers may become sensitized such that they develop symptoms when exposed even to tiny amounts of the allergen.

Symptoms that suggest the worker is developing asthma include coughing, wheezing, and shortness of breath. Symptoms may continue for several hours or longer even after exposure to the animals ceases and may also subside and then recur three or four hours following the exposure. A worker who has developed



## Laboratory Animal Allergies & Asthma: Symptoms, Prevention & Response

asthma symptoms from animal allergies often improves or recovers completely if he or she immediately stops being exposed to animal allergens. However, the longer the exposures continue, the more likely the asthma will persist, even after all contact with animals has stopped. In these sensitized persons, asthma is sometimes triggered by exercise, exposure to cold air, dust particles, strong odors or other agents. A life-threatening systemic reaction known as anaphylaxis occurs infrequently in sensitized individuals, usually after an animal bite or puncture with a needlestick contaminated with animal proteins (such as blood). Anaphylaxis is manifest by a severe, acute asthma attack, shock, and respiratory distress with generalized itching, hives, swelling of the lips, eyes, and/or extremities. Anaphylaxis may be fatal if emergency treatment, including epinephrine injections, is not given immediately. People at elevated risk should speak to their campus occupational medical service about being prescribed an epi-pen to have available in the event of an emergency.

Table 1-Allergic Reactions to Laboratory Animals

Disorder	Symptoms
Contact dermatitis	Redness, itchiness of skin, welts, hives
Allergic conjunctivitis	“Red Eye”, irritation and inflammation of the eyes
Allergic rhinitis	Allergic rhinitis produces the same symptoms as hay fever, including sneezing, itchiness, clear nasal discharge and nasal congestion.
Asthma	When an asthma attack occurs, the muscles of the bronchial tree become tight and the lining of the air passages swells, reducing airflow and producing the characteristic wheezing sound. Mucus production is increased. Most people with asthma have periodic wheezing attacks separated by symptom-free periods. Some asthmatics have chronic shortness of breath with episodes of increased shortness of breath. Other asthmatics may have cough as their predominant symptom. Asthma attacks can last minutes to days and can become dangerous if the airflow becomes severely restricted. In sensitive individuals, asthma symptoms can be triggered by inhaled allergens (allergy triggers), such animal allergens, dust mites, pollen and others or by exposure to chemical irritants
Anaphylaxis	A rare, severe allergic reaction that can occur upon exposure to a trigger such as animal allergens. The symptoms and course of anaphylaxis can vary. Initial signs of an anaphylactic episode can be deceptively mild, such as a runny nose, a skin rash all over the body, or a nondescript "strange feeling." These symptoms can quickly become more serious, including difficulty breathing, swelling of the throat causing obstruction of airflow, swelling of other parts of the body, rapid drop in blood pressure, and dizziness or unconsciousness.  Other symptoms of anaphylaxis include: <ul style="list-style-type: none"> <li>• Sense of impending doom</li> <li>• Hives</li> <li>• Tightness of the throat</li> <li>• Hoarse voice</li> <li>• Nausea</li> <li>• Vomiting</li> <li>• Abdominal pain</li> <li>• Diarrhea</li> <li>• Lightheadedness</li> <li>• Cardiac effects, including a rapid drop in blood pressure and irregular heart beat</li> </ul>



## Laboratory Animal Allergies & Asthma: Symptoms, Prevention & Response

### Prevention of Animal Allergies

#### Work Practices

Routinely implement the following procedures when working with laboratory animals to prevent animal allergies:

1. When appropriate, perform animal manipulations in a ventilated chemical hood or biological safety cabinet. Never use a horizontal laminar flow hood (also known as a blow-out hood because it blows air toward the operator). If bedding is to be dumped in a laboratory, it should be done in the chemical hood.
2. Animal facility cage wash staff handle all dirty cages according to SOP. This includes dumping dirty bedding inside a HEPA-filtered Dirty Cage Disposal Unit, Garb-el unit or other device approved by the Vivarium for this purpose. If engineering controls such as HEPA-filtered dumping station or Garb-el unit are not used respiratory protection (N-95 minimum) is required.
3. When not working in a hood or cabinet, make sure that the ventilation system in the room is working properly. If there is doubt, contact Physical Plant.
4. Animal Caretakers and Laboratory Animal Technicians wear uniforms or scrubs instead of street clothes. These are changed daily. Research personnel should wear lab coats over street clothes when handling animals or use disposable lab-coats, which are available in each UMDNJ Vivarium to decrease contamination of street clothes and to avoid potential exposure of family members.
5. Reduce skin contact with animals by wearing gloves and long-sleeved lab coats.
6. Laboratory clothes should be left in the lab and should not be worn while eating or after work.
7. Wash hands with soap and water frequently. Wash hands and face before leaving the work area and before eating or drinking.
9. Keep work area clean. Regular housekeeping routines must be established to ensure that the work place is as clean and free from animal allergens as possible.
10. Avoid bringing animals into the laboratory unless it is not feasible for the procedures to be performed in the animal facility.

#### Protecting Others while Transporting Animals

When animals are moved through the building, non-research staff and/or visitors to the University could be unexpectedly exposed to animal allergens. Precautions for moving animals include:

1. Use freight elevators only and avoid moving animals through public areas.
2. A microisolator top cage, animal transport carrier or a plastic bag over the cage must be used when transporting animals outside of the Vivarium. If a plastic bag is used it must be removed as soon as the animal arrives in the laboratory, in order to allow the animal free access to air.



## Laboratory Animal Allergies & Asthma: Symptoms, Prevention & Response

### Respiratory Protection

Engineering controls, rather than the routine use of respirators, should be the primary allergen control technique. However, if ventilation controls are inadequate or not feasible, a respirator may be helpful. EOHSS may make wearing a respirator a requirement of certain procedures.

Non-symptomatic personnel who are not required to wear a respirator, but who wish to wear one voluntarily while in animal areas to prevent exposure to potential allergens should be accommodated wherever possible. Persons wearing a respirator are required to be medically cleared, trained, and fit-tested as part of an overall respiratory protection program in compliance with the NJ Public Employees Occupational Safety and Health Program (PEOSH) regulations.

Figure 1- Traditional half face and PAPRs for protection from animal allergens



Example of an N95 Respirator



Example of a Powered Air Purifying Respirator (PAPR)

Each Vivarium has a written Respiratory Protection Plan for protection against animal allergens. The Plan includes a complete description of the program including a form for personnel to request a medical evaluation to wear a respirator. This form must include information about the type of respirator that is being considered for use. A confidential medical questionnaire, also included in the Plan, must be completed to determine if the employee has any medical conditions that may make it difficult to wear a respirator.

Table 2: URL Address of Written Respiratory Protection Plans and Forms for Requesting Medical Clearance for Wearing a Respirator and Fit-testing

School/ Unit	URL Address of Form for Requesting Medical Clearance for Use of a Respirator	To Arrange for Fit-Testing
NJMS	For surveillance: <a href="http://njms.umdj.edu/departments/medicine/divisions/gmed/documents/FormAnimalQuest-2.pdf">http://njms.umdj.edu/departments/medicine/divisions/gmed/documents/FormAnimalQuest-2.pdf</a> For medical evaluation for N-95 respirator: <a href="http://njms.umdj.edu/departments/medicine/divisions/gmed/documents/FormOshaRespShort.pdf">http://njms.umdj.edu/departments/medicine/divisions/gmed/documents/FormOshaRespShort.pdf</a> For medical evaluation for other respirators: <a href="http://njms.umdj.edu/departments/medicine/divisions/gmed/documents/FormOshaRespLong.pdf">http://njms.umdj.edu/departments/medicine/divisions/gmed/documents/FormOshaRespLong.pdf</a>	Contact EOHSS at x2-4812
RWMS Pisc/NB	Animal Contact Health Questionnaire <a href="http://www2.umdj.edu/eohssweb/ehs/exposure_questionnaire_vivarium.pdf">http://www2.umdj.edu/eohssweb/ehs/exposure_questionnaire_vivarium.pdf</a> Request For Medical Evaluation For Respirator Use <a href="http://www2.umdj.edu/eohssweb/ehs/request_for_medical_evaluation_for_respirator.pdf">http://www2.umdj.edu/eohssweb/ehs/request_for_medical_evaluation_for_respirator.pdf</a> OSHA Respirator Medical Evaluation Questionnaire <a href="http://www2.umdj.edu/eohssweb/ehs/respiratorymedical_evaluation_questionnaire.pdf">http://www2.umdj.edu/eohssweb/ehs/respiratorymedical_evaluation_questionnaire.pdf</a>	Contact EOHSS at x5-4058
RWJMS Camden	Contact Cooper Occupational Health Services at (856) 342-2990	Contact EOHSS at x6-6189
SOM	Animal Contact Health Questionnaire <a href="http://www2.umdj.edu/eohssweb/fm/exposure_questionnaire_vivarium.pdf">http://www2.umdj.edu/eohssweb/fm/exposure_questionnaire_vivarium.pdf</a> Request For Medical Evaluation For Respirator Use <a href="http://www2.umdj.edu/eohssweb/fm/request_for_medical_evaluation_for_respirator.pdf">http://www2.umdj.edu/eohssweb/fm/request_for_medical_evaluation_for_respirator.pdf</a> OSHA Respirator Medical Evaluation Questionnaire <a href="http://www2.umdj.edu/eohssweb/fm/respiratory_medical_evaluation_questionnaire.pdf">http://www2.umdj.edu/eohssweb/fm/respiratory_medical_evaluation_questionnaire.pdf</a>	Contact EOHSS at x6-6189



Once the designated physician medically clears a person to be fit tested for a respirator, EOHSS must be contacted to assist with the selection of a respirator.

Traditional half face respirators require medical clearance as well as fit-testing to ensure a tight seal around the wearer’s face. Powered air purifying respirators (PAPRs) may be more comfortable in certain situations than traditional half-face respirators or N95 disposable respirators (See Figure 1). The PAPR units use a battery to draw air through a filter into the wearer’s breathing zone. Medical clearance is also required for these units. Regulations require annual training of all respirator-wearers and fit testing of non-PAPR units annually.

The NJ Public Employees Occupational Safety and Health Program regulations requirements for respirator use in the workplace include the following:

- ♦ A written respiratory protection program is required.
- ♦ Wearers must receive medical surveillance to ensure that they are physically capable of wearing a respirator.
- ♦ They must also be fit-tested annually by EOHSS to ensure that there is no leakage around the face piece.
- ♦ Annual respirator training is required.

### Medical Surveillance Program

All personnel with significant direct or indirect laboratory animal contact must be enrolled in a medical surveillance program. This includes all personnel who work in labs that are official satellite animal facilities. Personnel who work in laboratory rooms where animals are often present are also encouraged to enroll in the medical surveillance program. Contact the Vivarium office for your campus or the medical contacts listed in Table 3 for an enrollment form. IN addition, personnel and visitors who enter the vivarium on any business any be exposed to allergens. These individuals must also be made aware of their potential exposure. University support staff such as Physical Plant staff, Housekeeping staff, IST staff and others need to be enrolled in the program as well. The Medical Surveillance program provides employees with the opportunity to learn about their personal health risks as they relate to their working relationship with animals and to establish a baseline against which future changes in health can be measured. It also has the advantage of providing an opportunity to educate University support staff about animal research.

Skin testing to animal allergens or a RAST (blood test) may be recommended for some individuals with exposure to animal allergens. Skin testing conducted as part of a medical surveillance program may also include other allergens such as pollens, molds, and pet dander. If these tests are positive, they could indicate the employee's increased risk for development of laboratory animal allergies.

Personnel with LAA symptoms that require extensive medical treatment (for example, the use of steroid tablets) or personnel who suffer from repeated asthma attacks after reasonable accommodations have been taken to reduce exposure may have to be reassigned or consider leaving the offending job.

Table 3: Medical Surveillance Contacts by Campus

Newark/ Scotch Plains	Occupational Medical Services – 973-972-2900
New Brunswick/ Piscataway	Employee Health Services – 732-445-0123 x2
Stratford	SOM Family Medicine (Dr. Marvin Herring) – 856-566-6188
Camden	Cooper Hospital Occupational Health Services – (856) 342-2000



## Report Symptoms

Diagnosis of lab animal allergy is based on patient history, physical examination, and skin testing. A person (employee, student, etc.) who is experiencing symptoms should inform his or her supervisor, and complete a UMDNJ Incident Report, which is available from General Stores and in administrative offices. Completion of this form is critical for documenting the exposure and resulting symptoms. Completion of the form will also help ensure immediate and subsequent medical treatment. The completed form should be sent to the UMDNJ Department of Risk and Claims (phone 973-972-6277, fax 973-972-7257). Risk and Claims will arrange for an evaluation by a physician. In addition, personnel may also contact EOHSS or the Medical Contacts listed in Table 3 at any time to discuss concerns about animal allergens. Contact information for each campus is provided below.

## Emergency Procedures

Based upon the medical surveillance questionnaire, an epinephrine pen may be prescribed for personnel deemed to be at an elevated risk of anaphylaxis. Epinephrine constricts blood vessels in the digestive tract and skin and raises blood pressure. It also widens the air passages to make breathing easier. The earlier epinephrine is given, the more effective it is at stopping the reaction. Symptoms usually improve quickly after epinephrine is administered. Although epinephrine acts fast, its effects are short-lived and may require a second and third dose over several hours to control symptoms.

In the event that a person is having severe asthma or anaphylaxis, the campus Public Safety emergency number should be phoned to summon emergency medical help. If the person loses consciousness, their feet should be kept raised while waiting for medical assistance. Keep them warm and make sure their airway remains open. If he/she seems to be having trouble breathing, he/she should be placed on the ground with his/her head tilted back. This helps get the tongue out of the way of air flow.

Table 4: Emergency Medical Help by Campus

Campus	Emergency #
Newark	2-4490
New Brunswick/Piscataway	5-4000
Stratford	7-7777
Camden	7-7777

## References:

1. NIOSH Alert: Preventing Asthma in Animal Handlers, January 1998 DHHS (NIOSH) Publication No. 97-116, posted at: <http://www.cdc.gov/niosh/animalrt.html>
2. R. Bush and G. Stave, Laboratory Animal Allergy: An Update, ILAR Journal V44(1) 2003 Occupational Health and Safety in Biomedical Research [http://dels.nas.edu/ilar\\_n/ilarjournal/44\\_1/v4401BUSH.pdf](http://dels.nas.edu/ilar_n/ilarjournal/44_1/v4401BUSH.pdf)
3. ILAR Journal Online, Volume 42(1) 2001 Laboratory Animal Allergy [http://dels.nas.edu/ilar\\_n/ilarjournal/42\\_1/](http://dels.nas.edu/ilar_n/ilarjournal/42_1/)

## Contact Information:



Newark Campus  
(973) 972-4812 ♦ Fax (973) 972-3694

Piscataway/New Brunswick Campus  
(732) 235-4058 ♦ Fax (732) 235-5270

Scotch Plains Campus  
(908) 889-2486 ♦ Fax (908) 889-2496

Stratford/Camden Campus  
(856) 566-6189 ♦ Fax (856) 566-6352

Website ♦ <http://www2.umdnj.edu/eohssweb>