

Prevention of Allergies and Asthma in Animal Handlers

Anisa has been working in a research laboratory for six months. She works with a team of researchers who are studying the effects of novel cancer therapies. Part of Anisa's job involves collection of blood samples from mice in the vivarium for approximately two hours a day, three times a week.

Anisa has noticed that when she is in the procedure room working with mice, she develops certain symptoms, including itchy eyes, sneezing and a runny nose. Her symptoms improve when she leaves the procedure room.

Anisa is among the estimated 2-12% of workers in laboratory animal facilities who annually report new cases of allergic disease due to contact with laboratory animals. Animal-related asthma and allergies are exaggerated reactions of the body's immune system to animal proteins known as allergens. Although there are many people who work with laboratory animals that never develop allergies or asthma, animal handlers have a much higher risk of developing symptoms than those who do not work with animals.

Risk Factors

Some individuals may have pre-existing conditions that put them at higher risk of developing allergies or asthma when working with animals. If you have already experienced allergic responses to animals outside of work, you are probably at a higher risk of developing more serious disease with continued exposure to animal allergens. Some studies suggest that if you have a history of allergic reactions, such as dermatitis and hay fever, to a variety of substances, you may be more likely to develop allergies to laboratory animals.

Persons at greatest risk are those who already have asthma and have experienced allergic symptoms while working with animals. Individuals with this medical history can develop irreversible disease if exposure to allergens in the animal laboratory continues. [Learn more about occupational asthma.](#)

Signs and Symptoms

Most researchers who develop animal allergies present with a combination of symptoms, including:

- Nasal congestion
- Sneezing
- Watery, itchy eyes

Some researchers then go on to develop occupational asthma, a potentially debilitating disease. It is unusual for an exposed worker to develop occupational asthma prior to experiencing symptoms such as nasal congestion.

Although not as common as respiratory symptoms, some researchers may develop rashes or hives at the site of direct skin contact with allergens. Other skin symptoms include the development of hives under protective clothing, an allergic response to inhaling airborne allergens.

Rarely, animal workers may develop anaphylactic reactions after exposure to an allergen. This type of reaction is most commonly associated with an animal bite or needlestick injury sustained by a highly allergic person.

Anaphylaxis is a sudden, severe, potentially fatal systemic allergic reaction that can involve various areas of the body, such as the skin, respiratory tract, gastrointestinal tract and cardiovascular system. Symptoms occur within minutes to several hours after contact with the allergy-causing substance. Anaphylactic reactions can be mild to life-threatening.

Allergy symptoms can develop within a few minutes of exposure or many hours later. For this reason, researchers and animal husbandry staff often do not associate symptoms they experience with animal work performed work up to 8 hours prior.

Allergen Sources and Routes of Exposure

Researchers who work with animals can develop allergies to any species. However, most reports of lab-related animal allergies are associated with rats and mice, due to their frequent use in animal research.

Allergens can be present in the urine, hair, dander or saliva, depending on the animal species. For example, the mouse allergen most commonly associated with human disease is found in mouse urine, hair follicles and dander.

Animal allergens are carried on very small airborne particles. The airborne allergens can easily be inhaled. The most significant route of exposure to allergens for those who work with animals is inhalation. Other methods of exposure include direct skin and eye contact with allergens.

In studies that evaluate airborne concentrations of allergens, animal caretakers who perform activities such as cage cleaning are at highest risk of exposure to allergens, followed by research staff who perform animal procedures. Support staff, such as those who work in an adjacent office are at lowest risk, although studies have documented the presence of airborne animal allergens outside of animal facilities.

Controlling Your Exposure to Animal Allergens

The goal of the exposure control program is to reduce your animal allergen exposure to the lowest level possible. Minimizing your exposure can result in a reduction of allergic symptoms and prevent the development of laboratory animal allergies.

Our animal facilities are designed and maintained to reduce airborne allergens:

- Ventilation systems provide 10-15 air exchanges per hour in animal housing and procedure rooms.
- Bedding used in rodent cages sheds a minimum amount of dust.
- Ventilated or filter top cage racks reduce airborne allergen emissions.
- Frequent wet cleaning is conducted by husbandry staff.
- Rodent cage bedding is changed within biosafety cabinets or animal transfer stations, which control operator exposure to airborne allergens.

Research and animal husbandry staff can:

- Use biological safety cabinets, if available, when performing procedures on animals.
- If possible, choose animals that are known to be less allergenic. Juvenile female animals are less allergenic than older males.
- Reduce skin, hair and eye contact by using gloves, bonnets protective masks and disposable gowns.
- Always wash your hands upon leaving the facility.
- When spending long periods of time in the facility, change into scrubs and change out when leaving.

- Participate in the medical surveillance program offered by Employee Health.

Medical Surveillance

One of the goals of medical surveillance is to identify disease at an early stage. Early identification may increase the possibility of introducing treatment or prevention measures that can result in a more positive outcome.

Every person who performs animal research or provides maintenance and support services on a regular basis in an animal facility must participate in the Animal Worker Medical Surveillance program. You will be asked to complete a brief health history when you first begin work and then again at regular intervals. If the information you submit indicates you are at risk or have already developed laboratory animal allergens, Employee Health will conduct a detailed health assessment. If appropriate, you will be referred to a physician who specializes in diagnosing and treating allergies. Employee Health, your allergist and specialists from Environmental Health and Safety will work together to develop a plan to reduce your exposure.

Always tell your treating physician that you work with lab animals!

Respiratory Protection

A respirator protects against inhalation of airborne hazards if it is properly selected and used. At Princeton University, Environmental Health and Safety oversees the use of respirators, **even if worn voluntarily**. You must be fitted, trained and medically evaluated before you wear a respirator, including an N-95 mask, to reduce exposure to laboratory animal allergens.

If you are concerned that your job or research may be affected if you report allergies to Employee Health, consider some important facts:

- **Studies have shown that continued exposure to allergens may have a profound effect on your overall health.**
- **Persons who fail to report and seek treatment for occupational asthma may continue to suffer severe and debilitating asthma attacks years after exposure to allergens has stopped.**
- **There may be controls that can be used to decrease your exposure. Employee Health clinicians, allergists and specialists from Environmental Health and Safety can help you develop a plan.**

If you have questions:

Employee Health
Sarai@princeton.edu 8-5305

Environmental Health and Safety
jw6@princeton.edu 8-5294