ARKANSAS COLLEGES OF HEALTH EDUCATION

Zoonoses Associated with Rodents

This document provides information on various diseases that can be passed from rodents to people. Often these diseases do not make the animal appear sick but can cause serious illness in humans. Persons with specific medical conditions such as a chronic illness, immunodeficiency, and pregnancy may be at higher risk of developing disease or complications from a zoonotic disease and should consult with their physician before working with animals. Additional information on zoonotic diseases can be found on the Center for Disease Control and Prevention Website, Healthy Pets, Healthy People.

Rodents housed at ACHE are bred and raised under strict hygienic conditions and are bred and/or tested to be free of pathogens that could be transferred to people. These rodents are called "specific pathogen-free" or "SPF" rodents. Zoonotic diseases from these animals are rare, but appropriate PPE should be worn at all times.

Rodents that are housed outdoors, captured from wild populations, or that are purchased from a pet store or from a breeder who sells rodents as feed for reptiles may carry zoonotic diseases. If handling wild caught rodents, please refer to the Zoonoses fact sheet for wild rodents and the CDC hantavirus guidelines (CDC Hantavirus) for more information. Zoonotic diseases associated with rodents include rat bite fever, tularemia, hantavirus, lymphocytic choriomeningitis virus, leptospirosis, salmonellosis, campylobacteria's, and giardiasis.

Rat Bite Fever caused by Streptobacillus moniliformis or Spirillum minus is a bacterial infection of rodents that is transmitted through bites, scratches, direct contact with animals and their urine, saliva, and feces, or ingestion of contaminated food or water. Infected rodents typically exhibit no symptoms of disease. **Francisella Tularensis** is another bacterial infection of rodents. Infected rodents appear lethargic, but they may shed bacteria before showing illness. Tularemia is transmitted to people in the same manner as rat bite fever, but in addition can be transmitted through the bite of an infected tick and via airborne transmission if feces, urine or body fluids are aerosolized. Both diseases in humans initially present with a fever, headache, swollen lymph nodes, and possibly a rash or ulcer around a recent bite or scratch wound. Any bites or scratches should be thoroughly washed immediately to minimize the chance of infection.

Rodents with hantavirus, lymphocytic choriomeningitis virus (LCMV) and leptospirosis usually do not exhibit signs of disease. The disease agents are typically shed in the urine of infected animals, and people acquire the infection by inhalation, accidental ingestion, and direct contact with contaminated urine or feces. These are occasionally transmitted from bite wounds, and Leptospira can infect people through abraded skin. These diseases often initially appear as a mild flu-like illness in people but may progress to severe disease. LCMV infection can cause severe meningitis and hemorrhagic fever in people and is considered hazardous to the unborn fetus and may cause pre-term delivery or other complications in pregnant women. Please refer to the CDC Hantavirus guidelines (CDC Hantavirus) if working with wild rodents or in rodent-infested areas and buildings.

Salmonellosis, campylobacteria's, and giardiasis are acquired by contact and accidental ingestion of fecal material from infected rodents. Animals infected with these diseases may have diarrhea, but some may

show no symptoms of disease. Any animal with diarrhea should be suspected of having a zoonotic disease. Symptoms in people include diarrhea, vomiting, and abdominal cramps.

Individuals with exposure to rodents and rodent housing environments may develop allergic reactions to animal proteins (allergens). Approximately 11-44% of individuals working with rats and mice will develop an allergic reaction to animal proteins, and 5-10 percent of individuals will develop asthma. Personnel may be exposed to allergens through inhalation and contact with skin, eyes, and mucous membranes. Animal allergens may be present in animal dander, hair, skin, urine, saliva, serum, and any contaminated feed or bedding materials. Risk factors for developing an allergic reaction include the history of previous allergies to animals. The signs and symptoms of an allergic reaction are nasal discharge and congestion, conjunctivitis, tearing, eye itching, skin redness, rash or hives, and lower airway symptoms (coughing, wheezing, and shortness of breath). Severe anaphylactic reactions to rodent bites have been reported. Individuals with symptoms suggestive of an allergic reaction related to a workplace allergen should report their concerns to their supervisor and consult a physician.

Wild, outdoor-housed, and pet-store-purchased rodents are much more likely to carry infections than those raised and housed in a laboratory setting. Transmission of zoonotic diseases from rodents is primarily by direct contact, bites, indirect contact with contaminated objects, oral ingestion, or inhalation of aerosolized bedding, feces and urine. We can protect ourselves from most diseases by using the following basic hygiene procedures:

- Do not eat, drink, apply cosmetics, or use tobacco products while handling animals or in animal housing areas.
- Wear respiratory protection when appropriate.
- Handle animals safely to avoid bites and scratches. Thoroughly wash any bite or scratch wounds and report injuries.
- Wear gloves when handling animals, animal tissues, body fluids, and waste, and wash hands after contact.
- Wear dedicated protective clothing such as a lab coat or coveralls when handling rodents. Launder the soiled clothing separate from your personal clothes, preferably at the animal facility.
- Report ill animals so that they can receive veterinary care.
- Keep animal areas clean and disinfect equipment after using it on animals or in animal areas.

Most importantly, familiarize yourself with the animals that you will be working with and the potential zoonotic diseases associated with each species. If you suspect that you have acquired a zoonotic disease at any time, inform your supervisor and seek medical care.

References

- Centers for Disease Control and Prevention. Healthy Pets, Healthy People. (Small Mammals | Healthy Pets, Healthy People | CDC)
- Centers for Disease Control and Prevention. Hantavirus Pulmonary Syndrome (HPS). (CDC – Hantavirus Pulmonary Syndrome (HPS) – Hantavirus)