Cornell University
Cornell Center for Animal Resources and Education

Potential Zoonoses/Hazards Associated with Reptiles

The intent of this Information Sheet is to describe the most common zoonotic agents seen in reptiles and the safe work practices suggested to mitigate the exposure to these pathogens.

TABLE OF CONTENTS

1. **Introduction:** This document provides information about potential zoonotic exposure while working with reptiles or their products (e.g. fecal sample) as well as hazards associated with venomous reptiles. The agents listed here are not all inclusive, but provide the most common zoonotic agents seen in reptiles. The safe work practices are provided as suggestions for staff and researchers who work with animals, in animal facilities, or with animal products.

2. **Zoonotic Pathogens**
    a. Salmonellosis
        i. Organisms: *Salmonella* spp.
        ii. Clinical Signs:
            1. Reptiles – usually asymptomatic carriers; can cause diarrhea
            2. Humans – diarrhea, nausea, vomiting, abdominal pain; increased incidence in immunocompromised individuals
        iii. Transmission: Fecal-oral route; handling contaminated objects; contact with contaminated surfaces

    b. Aeromoniasis
        i. Organism: *Aeromonas spp.*
        ii. Clinical Signs:
            1. Reptiles – asymptomatic; can cause ulcerative stomatitis, septicemia, anorexia, pneumonia, hemorrhage
            2. Humans – profuse diarrhea, fever, abdominal pain, vomiting; wound infection, cellulitis

iii. Transmission: Contact with contaminated water in open wounds; accidental ingestion of contaminated water or tissues; ingestion of bites or scratches inflicted by reptiles living in aquatic environments

c. Campylobacteriosis
    i. Organism: *Campylobacter* spp.
    ii. Clinical Signs
        1. Reptiles – usually asymptomatic carriers
        2. Humans – diarrhea, cramping, abdominal pain, fever
    iii. Transmission: Fecal-oral route; handling contaminated objects; contact with contaminated surfaces

d. Mycobacteriosis
    i. Organism: *Mycobacterium spp.*
    ii. Clinical Signs:
        1. Reptiles – granulomatous disease, ulcerative stomatitis (snakes)
        2. Humans – circumscribed granulomatous disease at site of infection; may have serious secondary complications in immunocompromised individuals
    iii. Transmission: direct contact with the organism through defects, scratches, or bites in the skin; inhalation; contact with contaminated surfaces

e. Zygomycosis
    i. Organisms: ubiquitous saprophytes belonging to class Zygomycetes
    ii. Clinical Signs:
        1. Animals – common GI inhabitants; can cause upper respiratory disease or pneumonia, granulomatous or ulcerative lesions
        2. Humans – upper respiratory infections, conjunctivitis, gastritis or enteritis, dermatitis or skin infections
    iii. Transmission: Inhalation, ingestion, inoculation, or contamination of the skin with spores

3. Venomous Species Hazards

While working in field conditions with resident populations of venomous reptiles or while handling venomous reptiles, there exists a risk of a venomous bite resulting in potentially severe illness or death. Precautions should be taken to avoid bites (e.g., personal protective equipment, animal handling devices) and to facilitate immediate emergency care if bites occur. Personnel should always work with at least one other person and be familiar with the venomous species that may be encountered, the exact location of the work (especially within the field), first aid measures in the event of a bite, as well as the location of the nearest hospital with available antivenom. In remote locations, hospitals (and antivenom) may be inaccessible; therefore, the knowledge of and the ability to contact evacuation services is highly important. A cell phone or satellite phone with stored emergency numbers should be available at all times as well as readily accessible transportation. Refer to the references provided below (#10-13) for further information.

4. **Safe Work Practices**
    a. Good Personal Hygiene
        i. Wash hands after working with animals or animal products and when leaving animal facilities. For further instruction refer to ACUP 713: Hygiene-Hand Washing.
        ii. Do not eat, drink, or use tobacco products in animal facilities.
    b. Personal Protective Equipment (PPE)
        i. Use proper PPE for work setting as appropriate (e.g. coverall, facemask, and respirator). Maintain dedicated protective clothing and footwear while working with animals or in animal facilities. Do not wear the same protective clothing outside of animal facility.
        ii. Wear disposable gloves during procedures that increase the likelihood of exposure to zoonotic agents (e.g. handling of birds or contaminated surfaces and/or equipment). Exercise increased caution when handling sick animals (i.e. animals showing clinical signs such as diarrhea or ruffled feathers).
        iii. Use surgical/face mask for routine care and N95 masks for protection during “aerosolizing procedures” (e.g. high-pressure hosing).
    c. Animal Care
        i. Isolate sick or infected animals when possible.
        ii. Handle and care for sick or infected animals last.
    d. Cleaning and Disinfection
        i. Maintain clean, dry, and uncluttered animal areas and workspace.
        ii. Disinfect laboratory work surfaces after each use. Use only disinfectants approved by facility managers and that are suitable for the potential agents identified in this information sheet.
        iii. Dispose of deceased animals, animal products, items contaminated by animal products, contaminated bedding, and laboratory waste in a facility approved manner.
    e. Proper Sharps Handling
        i. Work only with one uncapped needle at a time and immediately dispose of after use in sharps receptacle.
        ii. Avoid recapping needles whenever possible.
        iii. For further guidelines refer to ACUP 711: Sharps Precautions.
    f. Medical Attention
        i. Contact Gannett Occupational Medicine office (607-255-6960) for medical evaluation if you suspect any exposure, or if you develop any symptoms associated with infection with zoonotic agents (e.g., fever, malaise, diarrhea, abdominal pain). Alternatively, see your own personal health care provider if any injury or potential exposure to a zoonotic agent occurs.
        ii. Notify the principal investigator or supervisor and complete an accident and injury report (see References).
    g. Allergies
        i. Handling of bedding and animal products may aggravate allergies. Proper use of PPE reduces, but does not eliminate, the risk of developing allergies. Refer to the Allergy Prevention web page (see References) for further information.

5. References

1) ACUP 711-Sharps Precautions: http://www.research.cornell.edu/care/documents/ACUPs/ACUP711.pdf
2) ACUP 713-Hygiene-Hand Washing: http://www.research.cornell.edu/care/documents/ACUPs/ACUP713.pdf
3) ACUP 718-Safety Guidelines for Field Work: http://www.research.cornell.edu/care/documents/ACUPs/ACUP718.pdf
4) Allergen Prevention: http://www.research.cornell.edu/Care/documents/OHS/AllergyPreventionFactSheet.pdf
5) Gannett Health Services, (607) 255-5155 or www.gannett.cornell.edu/
6) EH & S Accident Report: http://www.ehs.cornell.edu/forms/
7) A-Z Index for Foodborne, Bacterial, and Mycotic Diseases. CDC, NCZVED, 2010. http://www.cdc.gov/nczved/divisions/dfbmd/diseases/index.html
8) Acha, PN and B Szyfres. *Zoonoses and Communicable Diseases Common to Man and Animals, 3rd ed.* Washington, DC: Pan American Health Organization, 2001.
9) Colville, J and Berryhill, D. *Handbook of Zoonoses: Identification and Prevention*. St Louis: Mosby Elsevier, 2007.
10) Johnson-Delany, CA. *Reptile Medicine and Surgery, 2nd ed*. DR Mader, ed. Philadelphia: W.B. Saunders Company, 2006.
11) Emergency Preparedness and Response. *How to Prevent or Respond to a Snake Bite*. CDC, 2008. http://www.bt.cdc.gov/disasters/snakebite.asp
12) NIOSH Workplace Safety and Health Topics. Venomous Snakes. CDC, 2010. http://www.cdc.gov/niosh/topics/snakes/
13) Ernst, C. *Venomous reptiles of North America*. Washington: Smithsonian Institution Press, 1992.