



Potential Zoonoses Associated with Fish and Amphibians

Summary

Amphibians and fish can serve as a source of exposure to zoonotic agents. Although little published information is available regarding transmission of diseases associated with laboratory fish and amphibian research, several organisms have been identified as potential concerns. Awareness of the hazards, particularly for those who may be immune-compromised, and good hygiene practices can reduce the risk of infection while handling fish and amphibians and their tank water in the animal laboratory.

Potential for Transmission

Pathogens associated with fish and amphibians are transmitted to humans through accidental ingestion of organisms found in fecal material or direct contact of these organisms with broken, abraded or chapped skin. Persons who are immune-compromised, including those who have a medical condition or are taking medications that affect the immune system, such as steroids or chemotherapy, are at greater risk of developing disease after exposure to these pathogens

Zoonotic Agents of Concern

Mycobacterium

M. marinum, *M. fortuitum*, *M. xenopi*, *M. chelonae* and *M. abscessus* are nontuberculosis mycobacterium species that amphibians and fish. Infections in human are rare and occur primarily after exposure through direct contact of the bacteria with broken or abraded skin. After exposure, symptoms may appear in 7-14 days and can include dermatitis, nodules under the skin, lesions or skin loss. The infection can spread to nearby lymph nodes and has caused arthritis and bone infections. The more serious forms of disease are seen in immune-compromised persons.

Aeromonas spp.

Aeromonas hydrophila is a bacterium found worldwide in tropical fresh water fish and many amphibian species. In humans, exposure can cause gastroenteritis or localized skin infections. Immune-compromised individuals are more likely to acquire infections.

Salmonella spp.

Amphibians typically shed salmonellae in feces, making the aquatic environment a possible source of transmission. The amphibian host may shed the organism in the absence of clinical signs of illness. Acute gastroenteritis may develop in humans within 6 to 72 hours of ingestion of the bacteria. Clinical signs of salmonellosis consist of fever, nausea, diarrhea and abdominal pain. Most persons recover within 2 to 4 days, however, persons with weakened immune systems are more likely than others to develop severe illness. In the state of New Jersey, healthcare providers are required to report salmonellosis cases to the local health department within 24 hours of diagnosis.

Chlamydophila spp.

Several chlamydial agents have been associated with outbreaks in laboratory amphibian colonies, including *Chlamydophila pneumonia* and *Chlamydophila psittaci*. Route of transmission to humans is through direct contact and possibly the respiratory route. Humans may develop a mild febrile respiratory illness which can lead to more serious conditions such as bronchopneumonia.

Enterobacteriaceae

Edwardsiella tarda has been isolated from healthy amphibians. The bacteria causes gastroenteritis primarily in persons with weakened immune systems and is spread through accidental ingestion or direct contact with broken or wounded skin.

Other Zoonotic Organisms

The following organisms have been found in fish, amphibians and/or aquarium water. Transmission to humans is typically through accidental ingestion of contaminated tank water or contamination of skin wounds.

Bacteria: *Plesiomonas shigelloides*, *Pseudomonas fluorescens*, *Escherichia coli*, *Klebsiella Spp.*, *Streptococcus spp.*, *Staphylococcus spp.*, *Clostridium spp.*, *Erysipelothrix spp.*, *Nocardia spp.*

Protozoa: *Cryptosporidium spp.*

Prevention

Handwashing is the most important measure you can take to prevent transmission of zoonotic organisms when handling zebrafish and tank water. Wash your hands and arms with warm water and soap after handling fish and contacting tank water.

Wear gloves if you will spend a significant amount of time with your hands immersed in water or if you have cuts or abrasions on your hands and arms. Prolonged contact with water can result in abraded or chapped skin, which increases the potential for development of infection after contact with zoonotic organisms.

Report injuries or illnesses to your supervisor and University Health Services.

Cleanse hand and arm wounds immediately with soap and water and protect them from exposure to fish and tank water. Report dermatitis or skin rashes to University Health Services.

Always tell your treating physician about your research. Regardless of your symptoms, tell your physician about the work you do in the laboratory. Persons with weakened immune systems should seek advice from University Health Services practitioners on risks associated with exposure to zoonotic agents in the animal laboratory.

References:

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