



Image courtesy of Lizzy Griffiths  
<http://zebrafishart.blogspot.com/>

# Potential For and Prevention of Zoonoses Associated with Zebrafish

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This information sheet is intended for Princeton University faculty, students and staff who conduct research with zebrafish in the laboratory.

## Summary

The potential for transmission of zoonoses from cultured zebrafish is extremely low for immunocompetent staff. Awareness of the hazards, particularly for those who may be immune-compromised, and good hygiene practices can reduce the risk of infection while handling zebrafish and tank water in the animal laboratory.

## Potential for Transmission

Pathogens associated with fish are most commonly transmitted to humans through ingestion of infected tissue or contaminated water or direct contact 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 fish pathogens.

## Fish-borne Zoonoses

### *Mycobacterium*

*M. marinum*, *M. fortuitum*, *M. chelonae* and *M. abscessus* are nontuberculosis mycobacterium species that affect zebrafish. 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*, a bacterium found worldwide in tropical fresh water, is part of the normal intestinal microflora of healthy fish. In humans, exposure can cause gastroenteritis or localized skin infections. Immune-compromised individuals are more likely to acquire infections.

## Other Zoonotic Organisms

The following organisms have been found in fish 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*, *Salmonella spp.*, *Klebsiella Spp.*, *Edwardsiella tarda*, *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.

**University Health Services**  
Student Health: 609-258-3141  
Employee Health: 609-258-5035

**Environmental Health and Safety**  
Main Number: 609-258-5294

## References:

Byers, K.B. & Matthew, J.L. (2002) Use of Zebrafish and Zoonoses. *Applied Biosafety*, 7(3), pp 117-119.

Haenan, O.L.M., Evans J.J. & Berthe, F. (2013). Bacterial infections from aquatic species: potential for and prevention of contact zoonoses. *Rev Sci Tech*, Aug; 32(2):497-507.

Zebrafish International Resource Center. (2014). Disease of Zebrafish in Research Facilities. Available at: <http://zebrafish.org/health/diseaseManual.php> (accessed on 2 February 2015).

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