

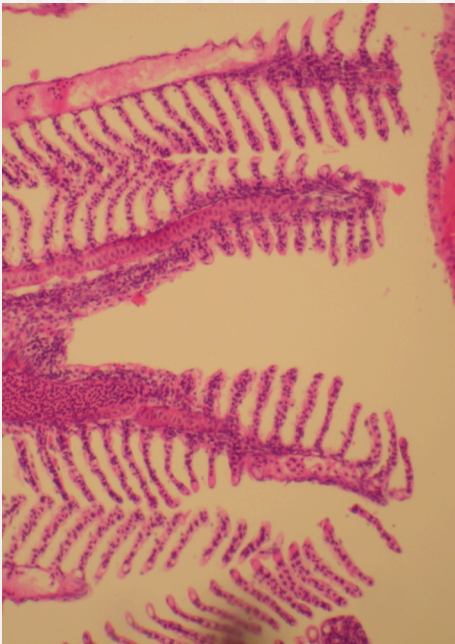
Zebrfish Disease Identification

For Staff

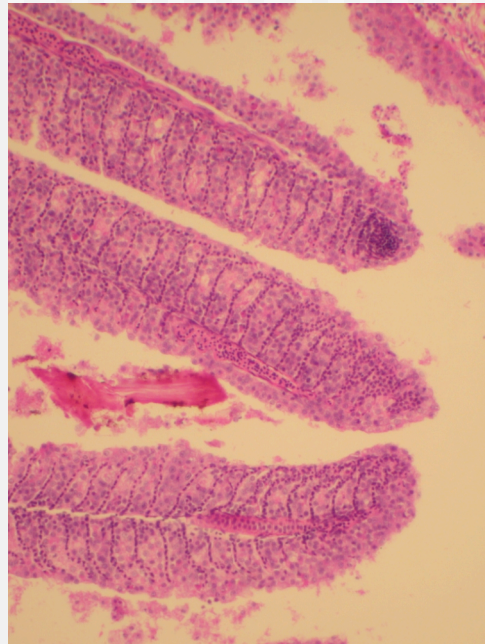
- Water Quality Related
- Infectious
 - Bacterial
 - Protozoan (1 cell)
 - Metazoan (>1 cell)
 - Fungal
- Noninfectious & Idiopathic

Diseases of Water Quality: Ammonia & Nitrite Toxicity

- Over-feeding, stagnant water flow, crossing cages, shipping bags, poorly rinsed paramercia



normal gills



response to elevated ammonia

- Hyperexcitability or off feed
- Gill epithelial hyperplasia (↑ cell #) and hypertrophy (↑ cell size) impairs oxygen and ion exchange

Diseases of Water Quality: Gas Bubble Disease



When water that is supersaturated with gas is exposed to atmospheric pressure the gas equilibrates and comes out of solution. If it equilibrates in the fish it results in gas bubbles in blood vessels and tissues. Supersaturation can occur when deep cold water is pumped and warmed under pressure or with a leak in a pressurized system.

Diseases of Water Quality: Chlorine Toxicity



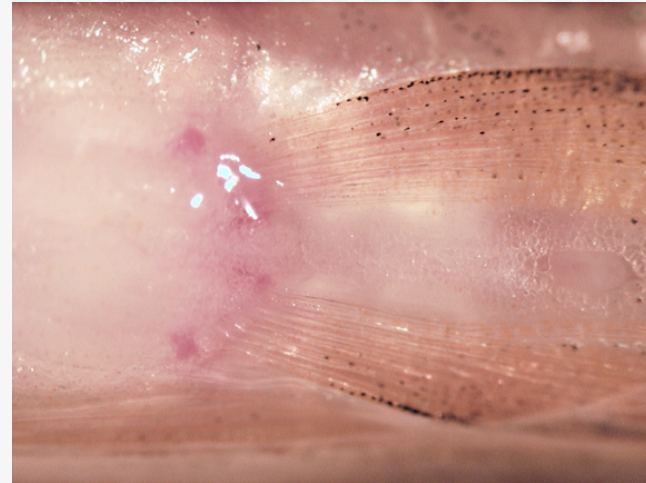
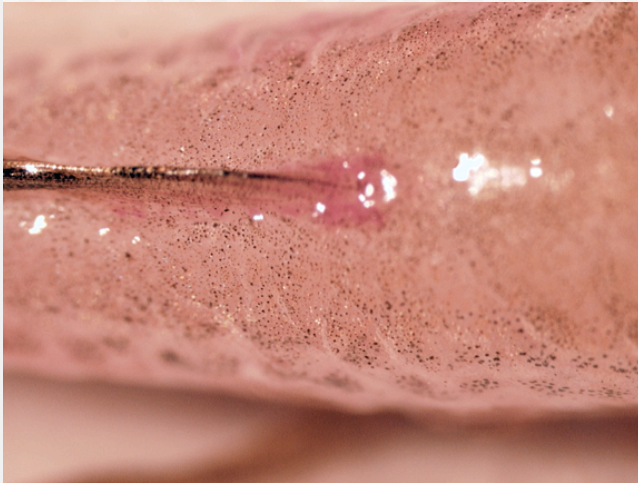
Small amounts of chlorine or bleach result in rapid gill necrosis (cell death), asphyxiation, and death.

Bacterial: Dermal Infections



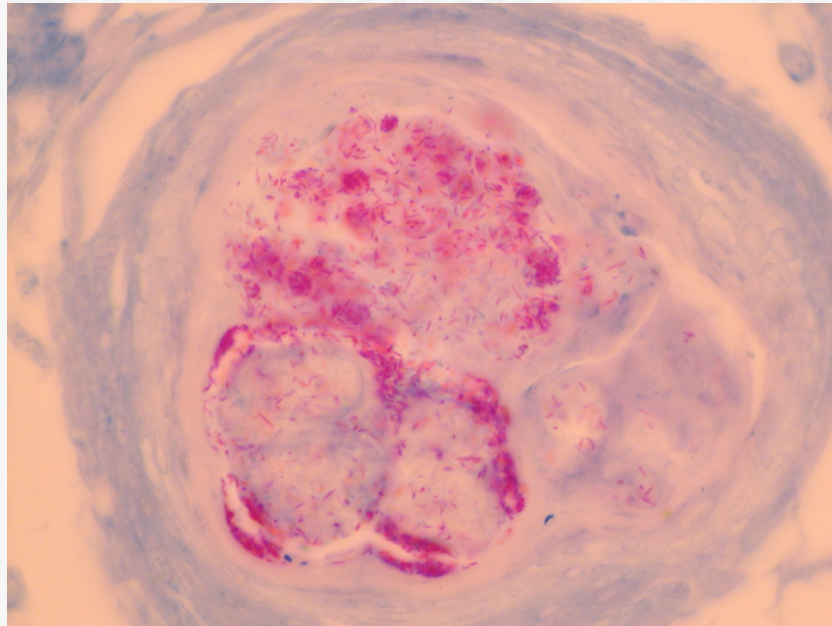
Most bacterial infections are due to opportunistic bacteria that are normal, ubiquitous components of the environment.
These infections usually reflect an underlying compromised immune response.

Bacterial: Systemic Infections



Clinical signs of systemic bacterial infections:
Dropsy (edema), redness (erythema or hemorrhage), blood tinged abdominal fluid

Bacterial: Mycobacteriosis

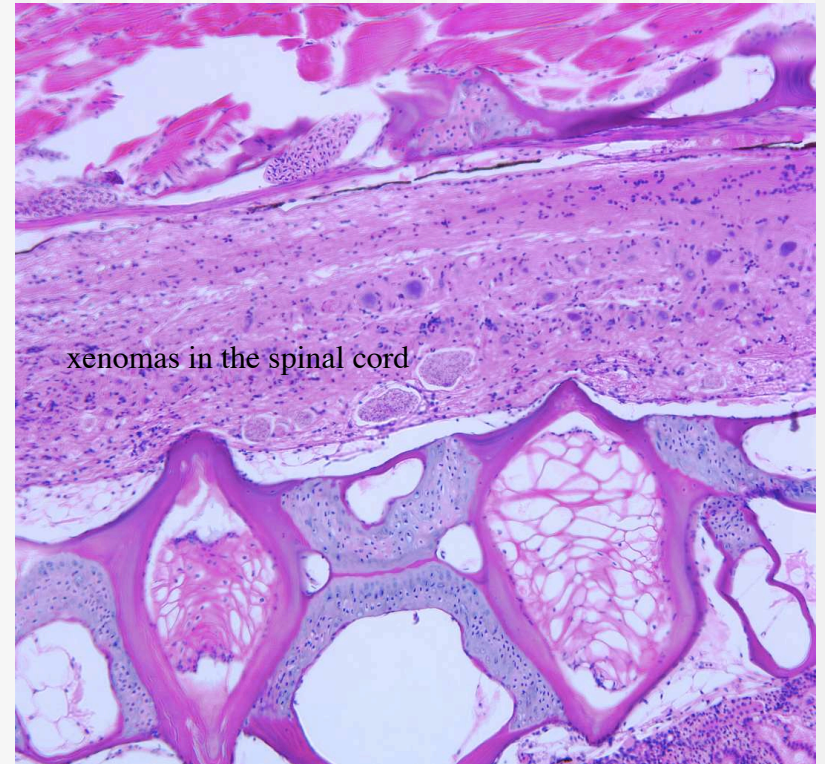
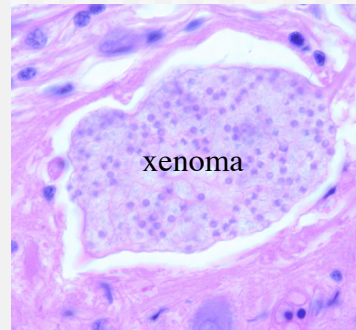
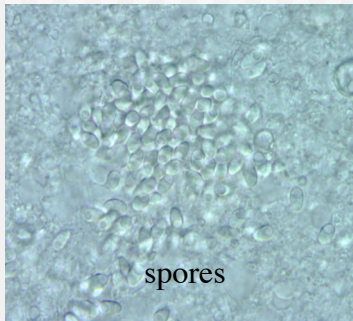
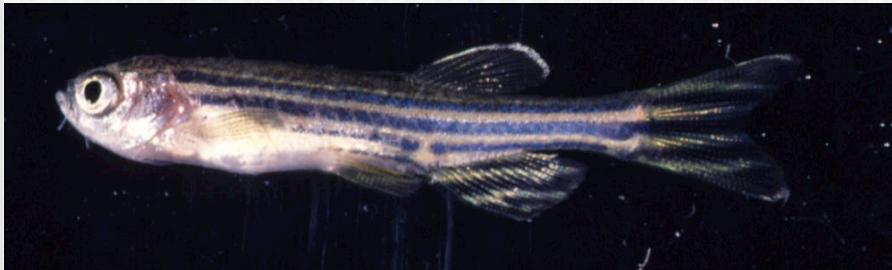


Presentations range from subclinical to ulcerations.

Mycobacterium sp. are gram + acid fast bacilli that result in granulomas within the tissues.

ZOONOTIC: Fish *Mycobacterium* can cause granulomas in people; usually on extremities and usually in people with compromised immune systems. Wash your hands. Protect cuts and tell a supervisor if you have cuts or abrasions and don't want to clean dirty tanks.

Protozoan: Microsporidiosis



Formerly known as “skinny disease” but lots of things result in skinny fish. Fish ingest the spore stage then develop xenomas (huge spore packed cells). Infections are usually in the spinal cord and brain and are less frequently seen in non-neuronal tissue.

Protozoan: Velvet Disease (Piscinoodinium)

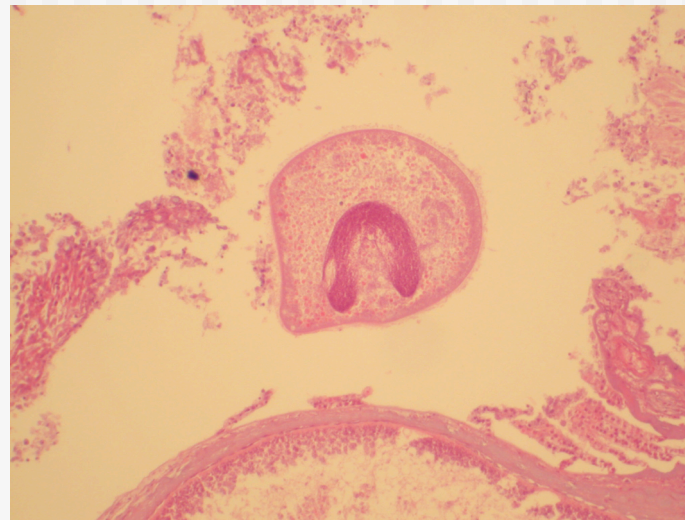
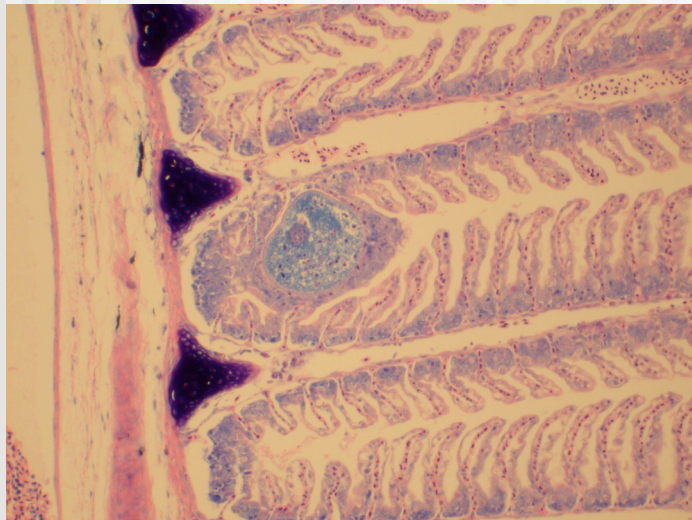


Common in ornamental fish. Currently not common in zebrafish research facilities. The parasite feeds on the skin and gill epithelium resulting in a golden dusty sheen and labored breathing.

Protozoan: Ichthyophthirius



“Ich” or “white spot disease” is very common in freshwater aquarium fishes. So far it has not had the same impact on zebrafish.



The parasite penetrates skin and gill epithelium resulting in increased mucus production, labored breathing, and lethargy.

Protozoan: Larval fish predators

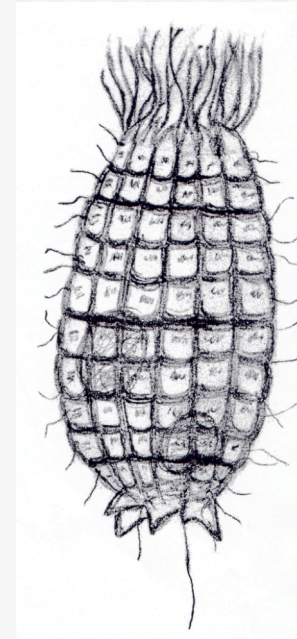
- *Tetrahymena* spp.

- Pear-shaped, ~40x75 μ m



- *Coleps*

- Grenade-shaped, 50-80 μ m



These free-living protozoa feed on dead and dying animal tissue. With large populations and dirty water they can affect live fish too resulting in invasive lesions and death.

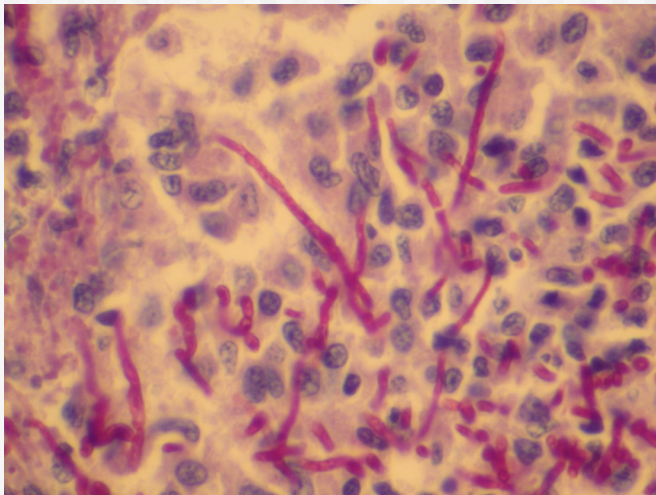
Metazoan: Intestinal Capillariasis



cross-section of worms in the fish intestine

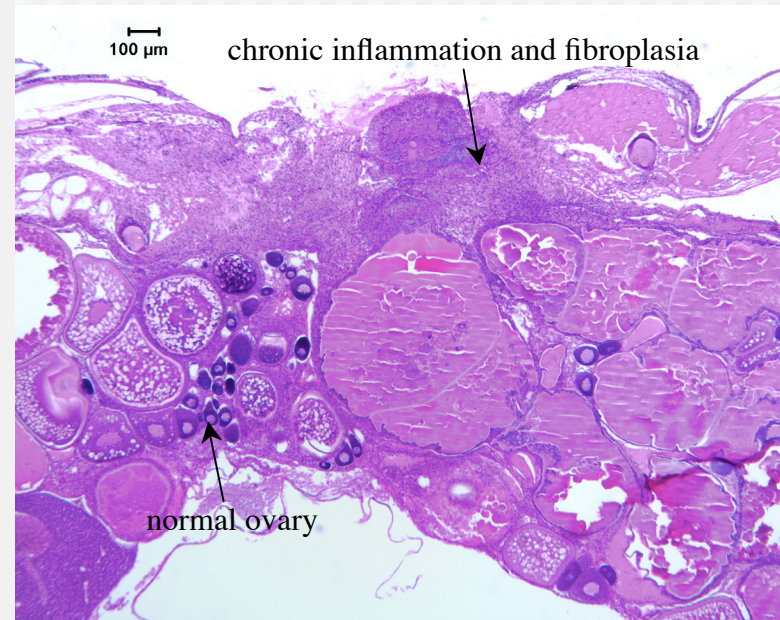
Infected fish may appear dark, emaciated, lethargic, or anemic. The worms can result in invasive intestinal lesions and have been associated with intestinal neoplasia.

Fungal: Water Molds



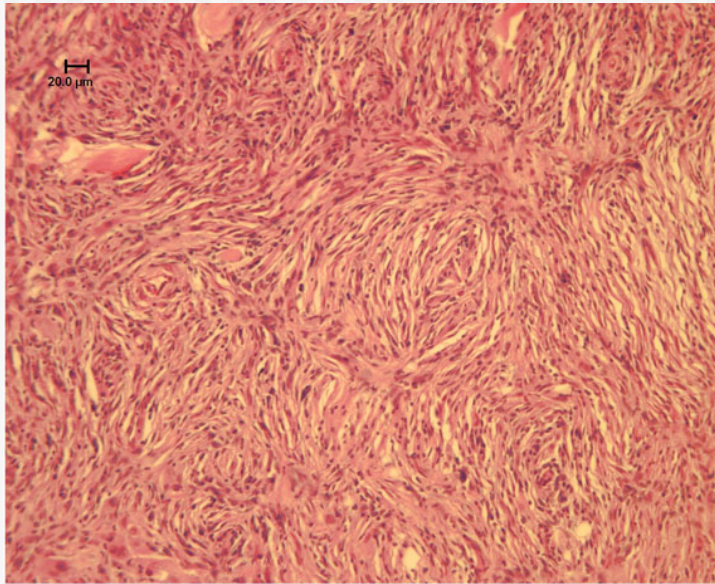
Usually opportunistic infections of normal environmental organism.
External lesions appear white and fluffy.

Noninfectious & Idiopathic: Egg-Associate Inflammation and Fibroplasia



The cause of EAIF is unknown. We suspect that it starts with abnormal egg retention and therefore recommend regular spawning. Fish may have distended abdomens and it rarely results in external lesions.

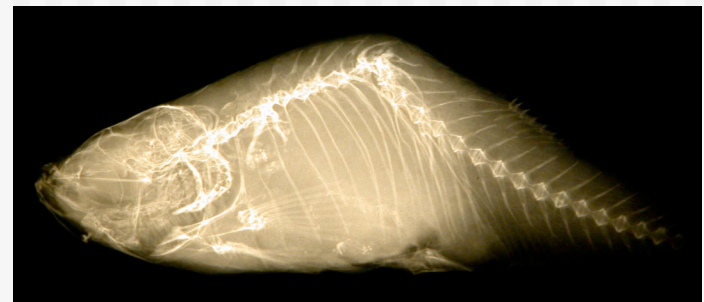
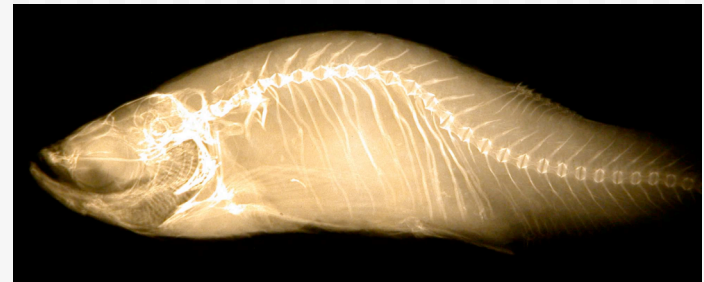
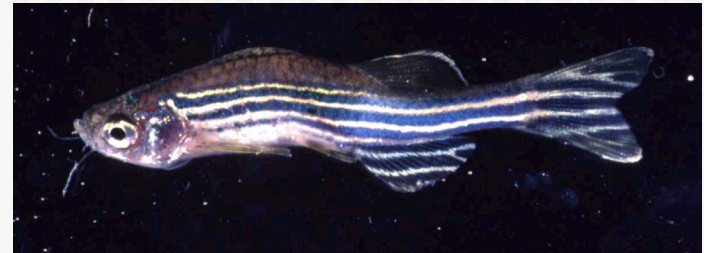
Noninfectious & Idiopathic: Spontaneous Neoplasia



Tumors may appear as masses or swellings. The most common zebrafish tumors occur in the testis, intestine, and ultimobranchial gland.

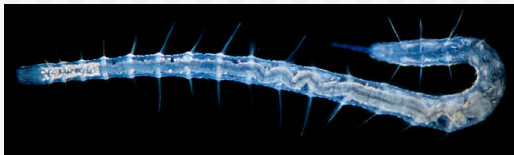
Noninfectious & Idiopathic: Spinal deformities

- **Congenital**
 - Genetic
 - Temperature, pH or salinity
- **Acquired**
 - Nutrition
 - Phosphorus, tryptophan or Vit. C def.
 - Physical Trauma
 - Vertebral fracture or luxation
 - Infectious Agents
 - *P. neurophilia*, *mycobacterium* spp.,
Aeromonas hydrophila,
 - Chemical Agents
 - Heavy metals, organochlorines



Non-Pathogenic Organisms

While these are not directly pathogenic to zebrafish they indicate a high level of dirt and debris in the environment.



Oligochaete annelids



Aquatic mite



Midge larva & fly



Moth fly larvae & pupae

Fixation for histopathology

- Euthanasia - Ice or MS222
- Open abdominal cavity & remove tail
- ~10mL Dietrich's fixative per fish
- Label tube & place on rocker

