Aeromonas hydrophila

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THE BASICS

• GRAM-NEGATIVE, ROD-SHAPED BACTERIA
• INFECTS FISH, REPTILES, HUMANS AND AMPHIBIANS
• FOUND WORLDWIDE
• NOT A CAUSE OF MASS DIE-OFFS/OUTBREAKS

WHAT'S THE BIG DEAL?

• UBIQUITOUS
• SYMBIOTIC
• DEFENSIVE
• OPPORTUNISTIC

PATHOLOGY

Amphibian lines of bacterial defense:
1. Skin
2. Innate Immune System
3. Adaptive Immune System

Signs:
- Red Leg??
- Ulceration
- Hemorrhaging
- Edema
- Anorexia
- Lethargy

Sources:
- Wild Xenopus laevis
- surgery is removed
- 1 female with clinical signs
- tip ulcer and liver tested
depicted testing for Chytrid and Ranavirus
- Aeromonas +, Batrachochytrium +, and Micrococcus +
- Chytrid? Surgery Trauma?

http://www.snap.is/files/2013/09/NorthfordWoodFrogsBreeding-1600-1200x500.jpg
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2846011/#!po=22.7273
PATHOLOGY

Tennessen, et al.:
• *Lithobates pipiens*  
• Anti-microbial peptides:  
  - 4 new peptides found and tested  
  - 3 effective against chytrid fungus  
  - None effective on *A. hydrophila*

Schadich, et al.:
• *Xenopus laevis, Litoria aurea, Litoria raniformis, Litoria ewingii*  
• ECP’s vs. AMP’s  
• Proteases secreted by *A. hydrophila* allow for *E. Coli* growth

PATHOLOGY

AN INTERESTING CASE.....

Roth, et al.:
• 133 Cascade frogs sampled for *Batrachochytrium dendrobatidis*  
• 46 bacterial isolates  
  - 7% *Aeromonas*  
  - *B. d* vs bacteria  
  - *B. d* vs *A. h*  

Conclusions:  
• *Aeromonas hydrophila* = strong anti-*B. d* activity in vitro  
• Exosentix or ECP’s preventing Chytrid fungus?  
• Possible competitive exclusion of Chytrid fungus?

DECLINES

Habitat Loss  
Exotic Species  
Pollution  
Pet trades  
Diseases  
Climate Change

ALL INDUCE STRESS

Hypothalamus-Pituitary-Interrenal  
Circulonoids:  
• Lymphocytes  
• Stimulated in TIMES OF STRESS!!!  
  • Metamorphosis  
  • Explosive Breeding  
  • Post-hibernation  
  • Densities, Water Quality, etc.
Aeromonas hydrophila

Symbiotic, ever-present bacteria

Devastating pathological effects

Additive mortality to every other possible stressor!!

Favorable-time invader

Can’t stop it without fixing everything else

Normal anti-microbial skin peptides fail to suppress

SOURCES CITED


Rollins-Smith, A. Louise. Neuroendocrine-immune system interactions in amphibians - Implications for understanding global amphibian declines. Immunology Research. 23:23-244.

Roth, Tara; J. Foley; J. Worth; J. Piovia-Scott; K. Page; S. Lawler. 2013. Bacterial flora on Cascades frogs in the Klamath mountains of California. Comparative Immunology, Microbiology, and Infectious Diseases. 36:6:591-598.
