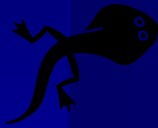


# Comparative Pathology of Ranaviral Disease among Amphibians, Reptiles and Fish



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## Amphibians

Swelling (most often edema)



Erythema, Ulcerations



**May vary by life stage**  
 [adults most reported from Europe, but elsewhere too]

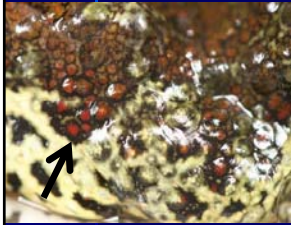


Photo courtesy Nathan Haislip



Photo courtesy Nathan Haislip

**Varies by host (species)-susceptibility & isolate**  
 (e.g., mortality: RI [ranaculture isolate] vs FV3)



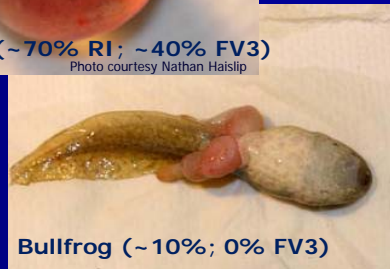
Wood frog (~ 100% for both)

Photo courtesy Nathan Haislip

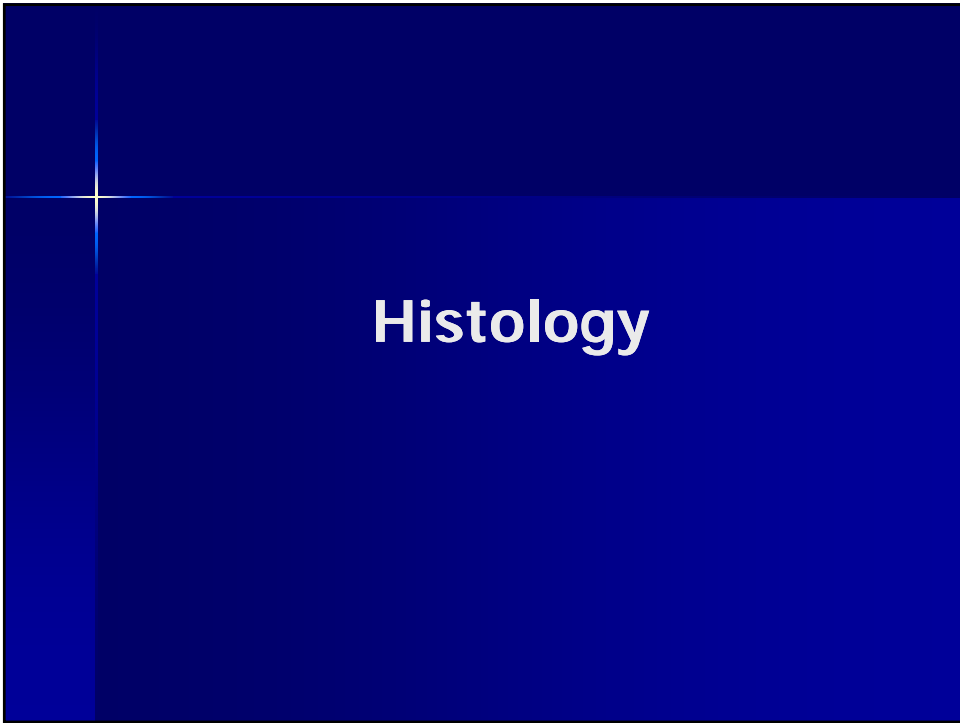
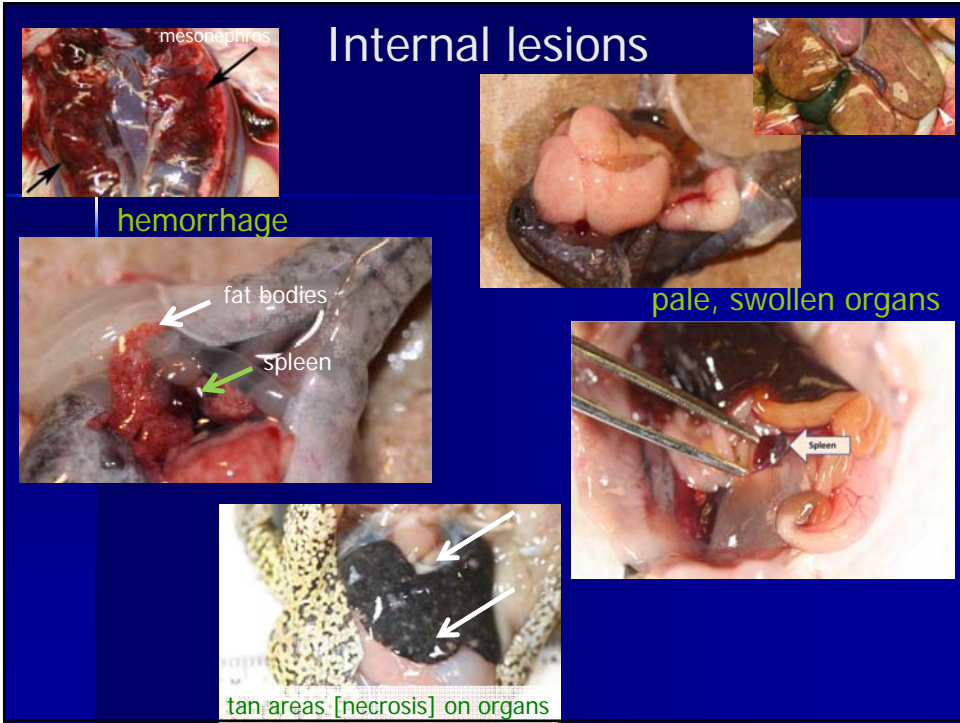


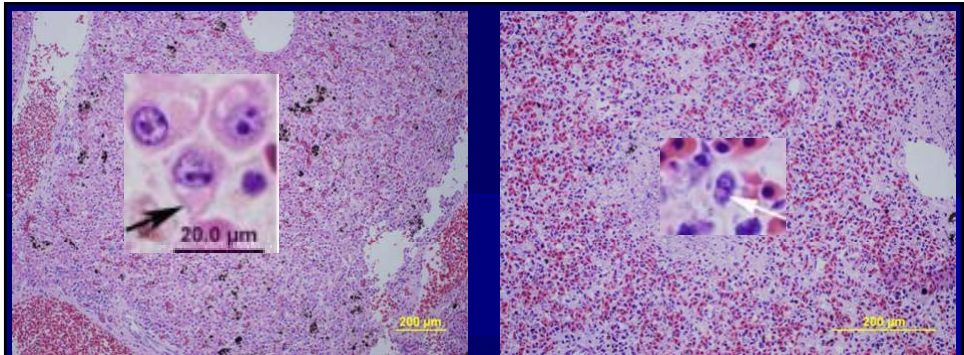
Cope's tree frog (~70% RI; ~40% FV3)

Photo courtesy Nathan Haislip

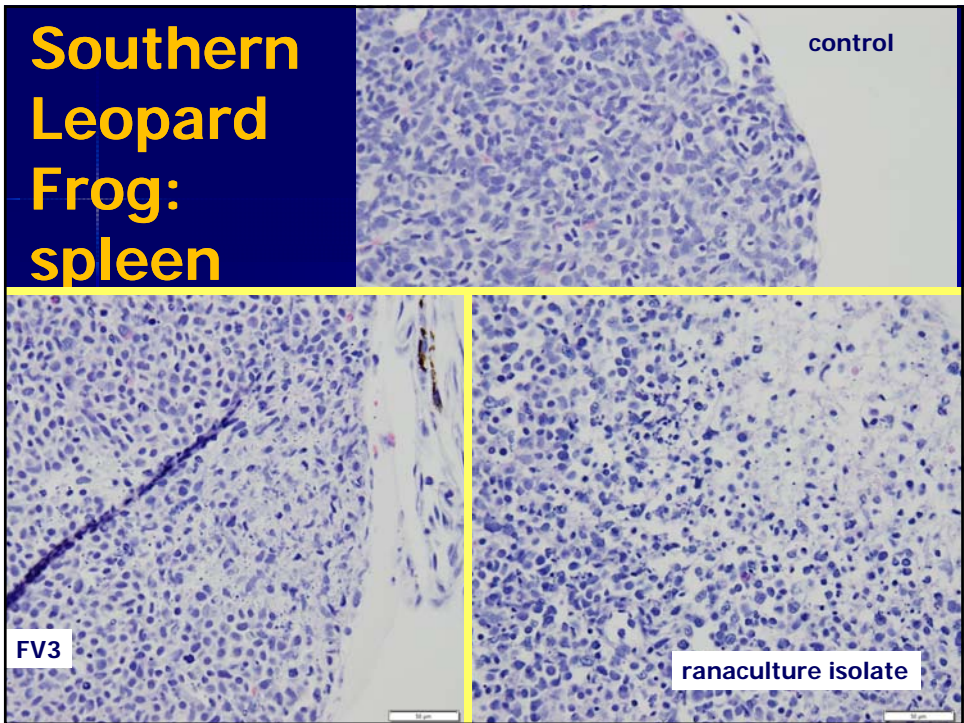
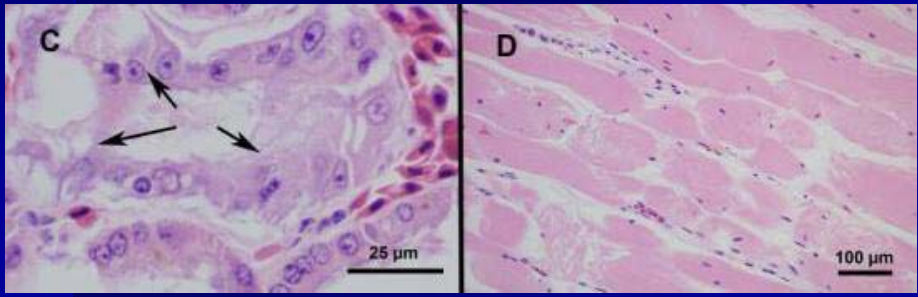


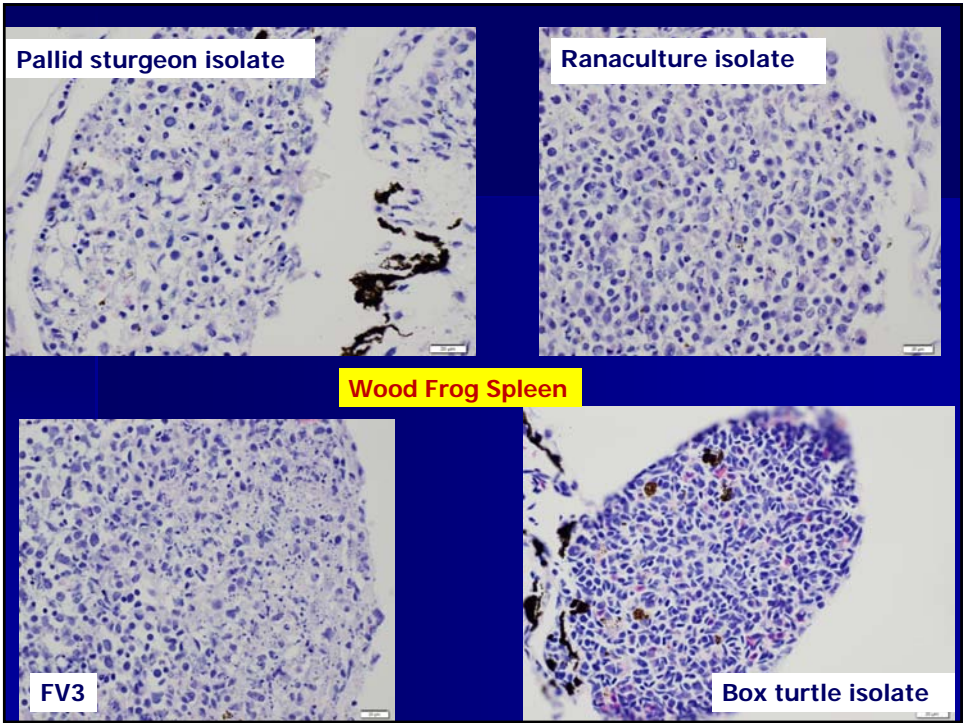
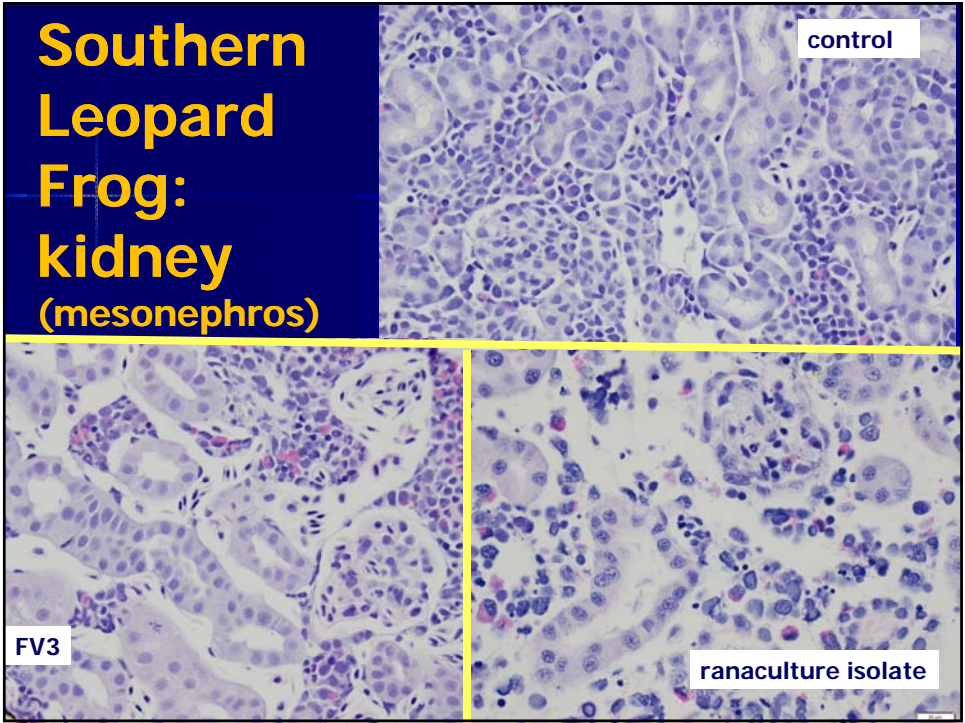
Bullfrog (~ 10%; 0% FV3)





## Histology

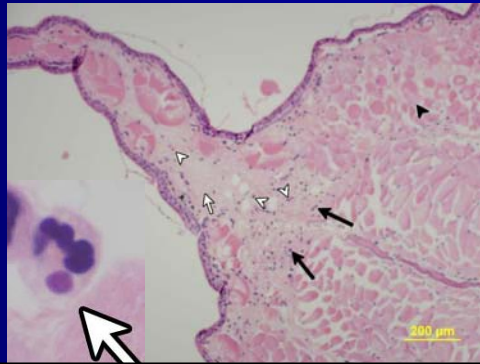
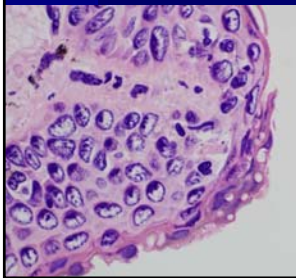
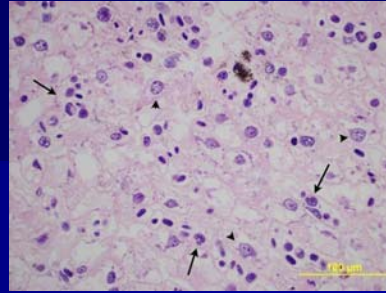




In North Georgia  
concurrent in morbid  
*Notophthalmus viridescens* and  
*Lithobates clamitans*.

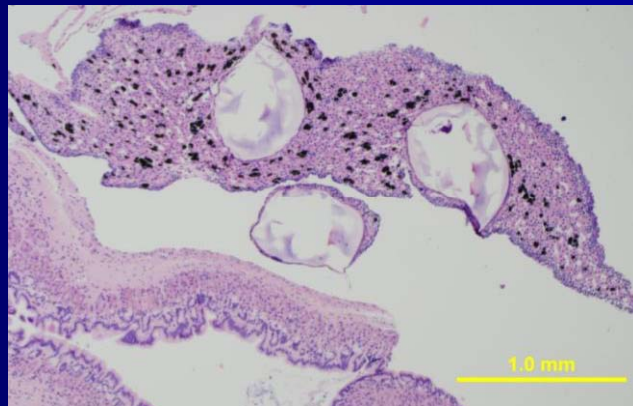


Photo, Betsie B. Rothermel



In Tennessee: Die-off in  
*L. clamitans*, *L. catesbeianus*, *N.*  
*viridescens*

*Ranavirus*-positive animals  
plus: Parasites increased



# What about reptiles?

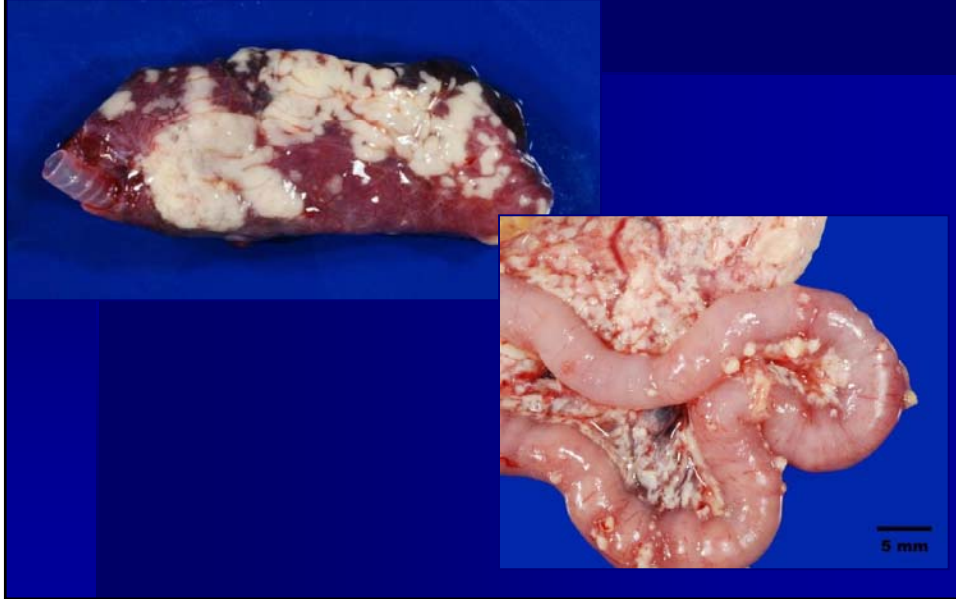
## SCWDS case

(slides courtesy of Dr. Mark Ruder)

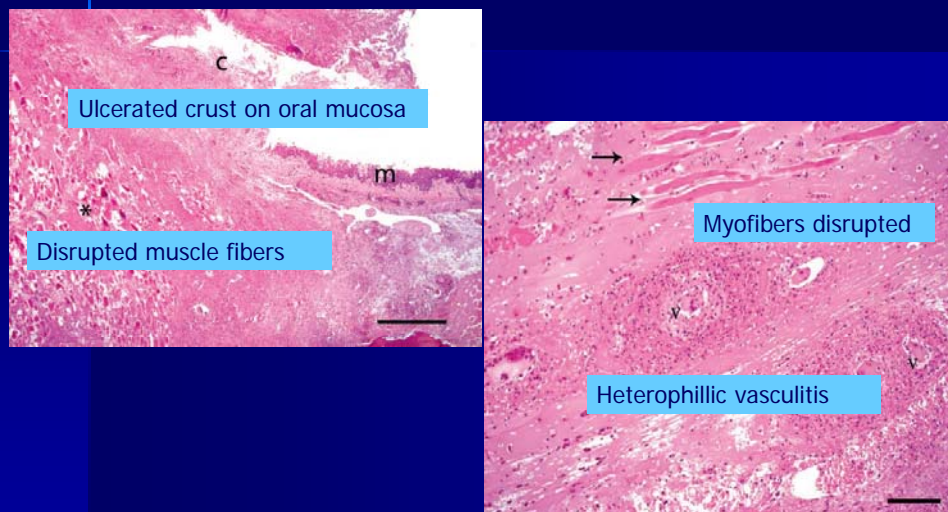
Eastern box turtle (*Terrapene carolina carolina*)



## Gross Findings (cont.)



## Some microscopic findings

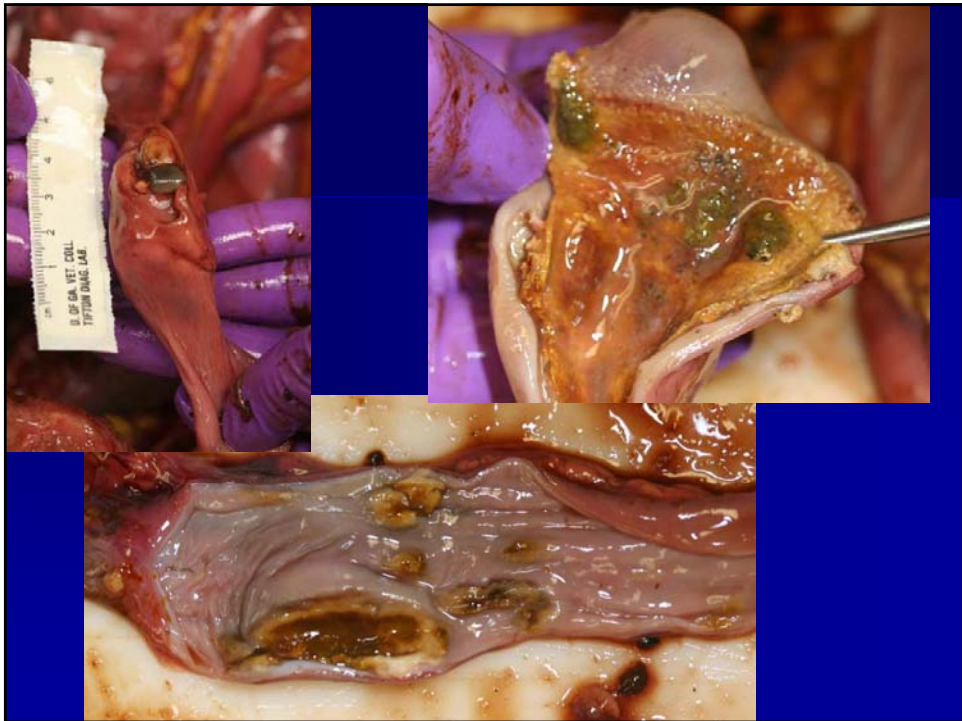




## Diagnosics

- *Ranavirus* isolated in tissue culture
  - Partial sequencing yielded Frog virus 3
- PCR on oropharyngeal swab and nasal flush
  - *Ranavirus* – positive
  - *Herpesvirus* and *Mycoplasma* - negative
- *Mycoplasma* culture of nasal flush
  - Negative

What about water turtles?

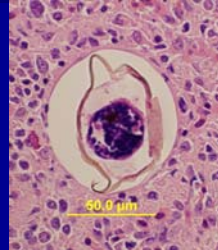


## Concurrent infections compound the diagnosis

### ■ Parasitism

#### – Soft shells

- Spirorchid eggs (often systemic)
- Entomeoba spp trophozoites (intestines only)



### ■ Bacterial Enteritis

#### – Sliders

## Current investigation:



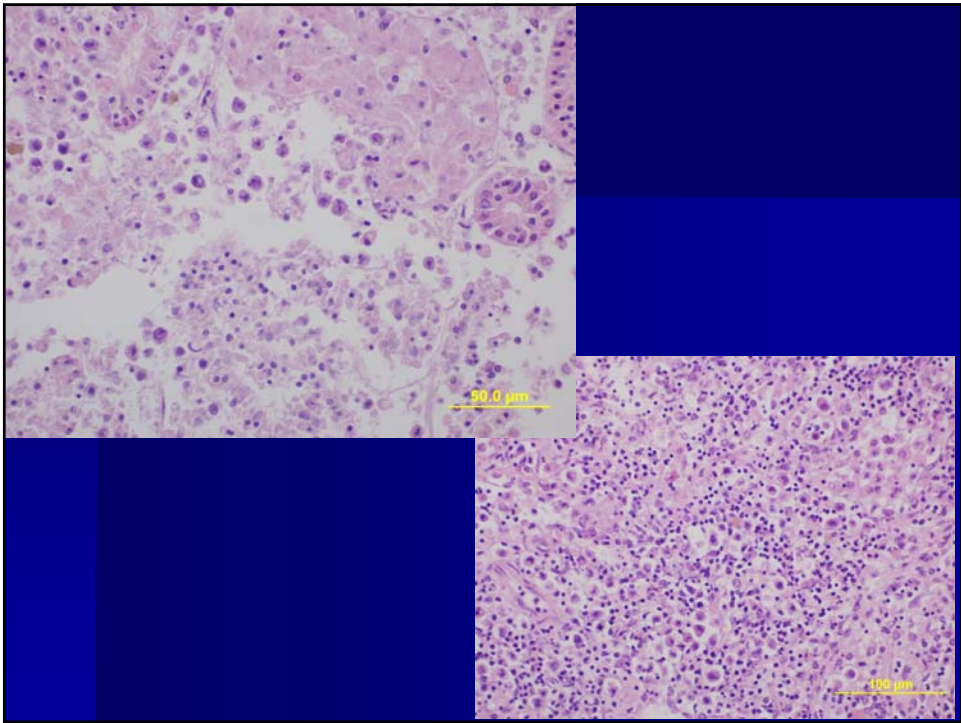
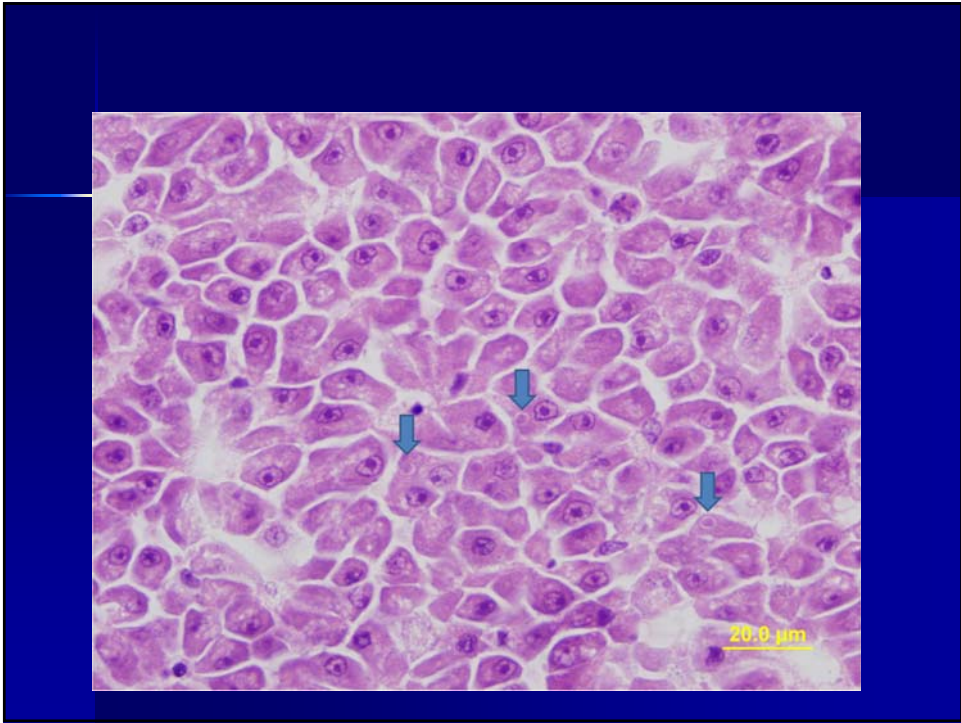
## What about Fish?

### Fish-creek chub

- Ecchymosis and petechiation on the ventral surface
- Pale gills and liver
- Friable kidneys and liver
- Lesions/organs PCR positive for ranavirus

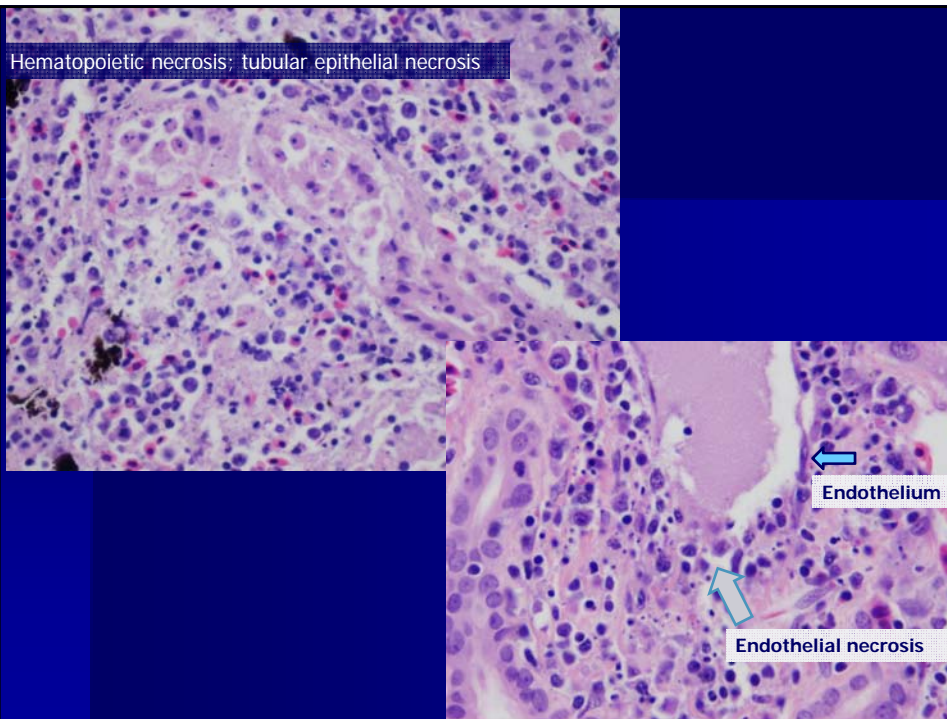


Photo courtesy Emilie Travis



# Pallid Sturgeon Isolate from mortality event

Photos Courtesy Tom Waltzek

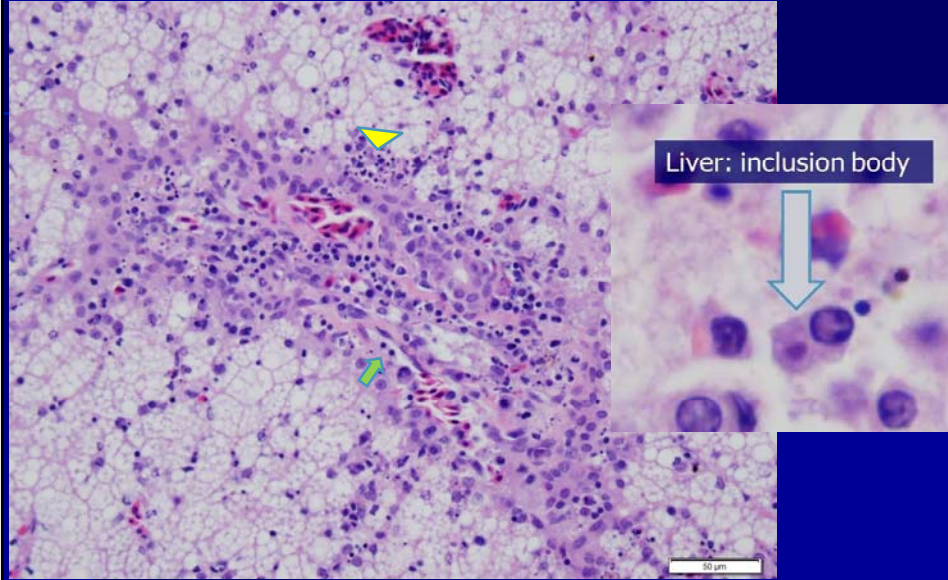


Hematopoietic necrosis; tubular epithelial necrosis

Endothelium

Endothelial necrosis

Liver: Portal triad: endothelial necrosis (arrow)  
Also: hematopoietic necrosis (arrow head).



## Planned investigation:

Pilot study: fish challenges (Fall 2011)

## Acknowledgements

- Matt Gray
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- Emilie Travis
- Kevin Keel
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## Questions?

