

# *Ichthyophonus* 2010

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# Sampling Goals & Challenges

## Emmonak:

$n=150$

Reached

## Eagle:

$n=200$

Reached, but one sample did not contain any tissue, so  
199

## Challenges:

Low Abundance

Flooding / Road Washout

Limited time





# Samples Taken

- ASLGW
- Genetics
- Whole blood and blood plasma
- Heart
- Otoliths (Unrelated, collaborative study)
- Eggs (Eagle only)



# Tests Underway



- ***Ichthyophonus* Culture** (Eagle and Emmonak)  
Completed
- ***Ichthyophonus* PCR** (Eagle and Emmonak)  
Emmonak Completed / **Eagle in Progress** (extraction problems)
- ***Ichthyophonus* Histology** (Eagle only)  
Will be submitted on all positives and fish with clinical signs (not part of this study)
- **Data Entry** (Eagle and Emmonak)  
**Ongoing**
- **Aging** (Eagle and Emmonak)  
Completed
- **Blood Chemistry** (Eagle and Emmonak)  
Completed / **Cortisol in Progress**
- **Fecundity** (Eagle only)  
Completed
- **Freeze Drying** (Eagle only)  
Completed
- **Lipid Extraction** (Eagle only)  
Completed
- **Nitrogen/Protein/Ash** (Eagle only)  
Completed
- **Bomb Calorimetry** (Eagle only)  
Completed





# Emmonak

## Time Frame:

June 9 to July 12, 2010

## Prevalence (by culture):

13 of 150 or 8.7%

## Morphometrics all sampled fish only

Length: 804 ± 83.4 mm

Girth: 492 ± 47.8 mm

Weight: 19.1 ± 5.0 lbs

46% female

## Age composition all sampled fish

Age 3: 0.7%

Age 4: 2%

Age 5: 52%

Age 6: 38%

Age 7: 4%

Unknown: 3.3%



## Morphometrics infected

820 ± 93.7 mm

501 ± 55.9 mm

20 ± 5.4 lbs

62% female

## Age composition infected only

Age 5: 23.1%

Age 6: 76.9%



# Eagle

## Time Frame:

July 9 to July 28, 2010

## Prevalence (by culture):

14 of 199 or 7%

- Half of the infected fish did not show clinical signs of disease!

## Predominant gear type:

Fish Wheel and 14% 6" SGN

## Morphometrics all sampled fish

Length:  $742 \pm 91.4$  mm

Girth:  $391 \pm 55.8$  mm

Weight:  $12.5 \pm 4.7$  lbs

31% female

## Age composition all sampled fish

Age 4: 8%

Age 5: 58.5%

Age 6: 23.5%

Age 7: 2.5%

Unknown: 7.5%



## Morphometrics infected only

$750 \pm 104.5$ mm

$392 \pm 61.7$  mm

$12.5 \pm 4.9$  lbs

42.9% female

## Age composition infected only

Age 4: 7.1%

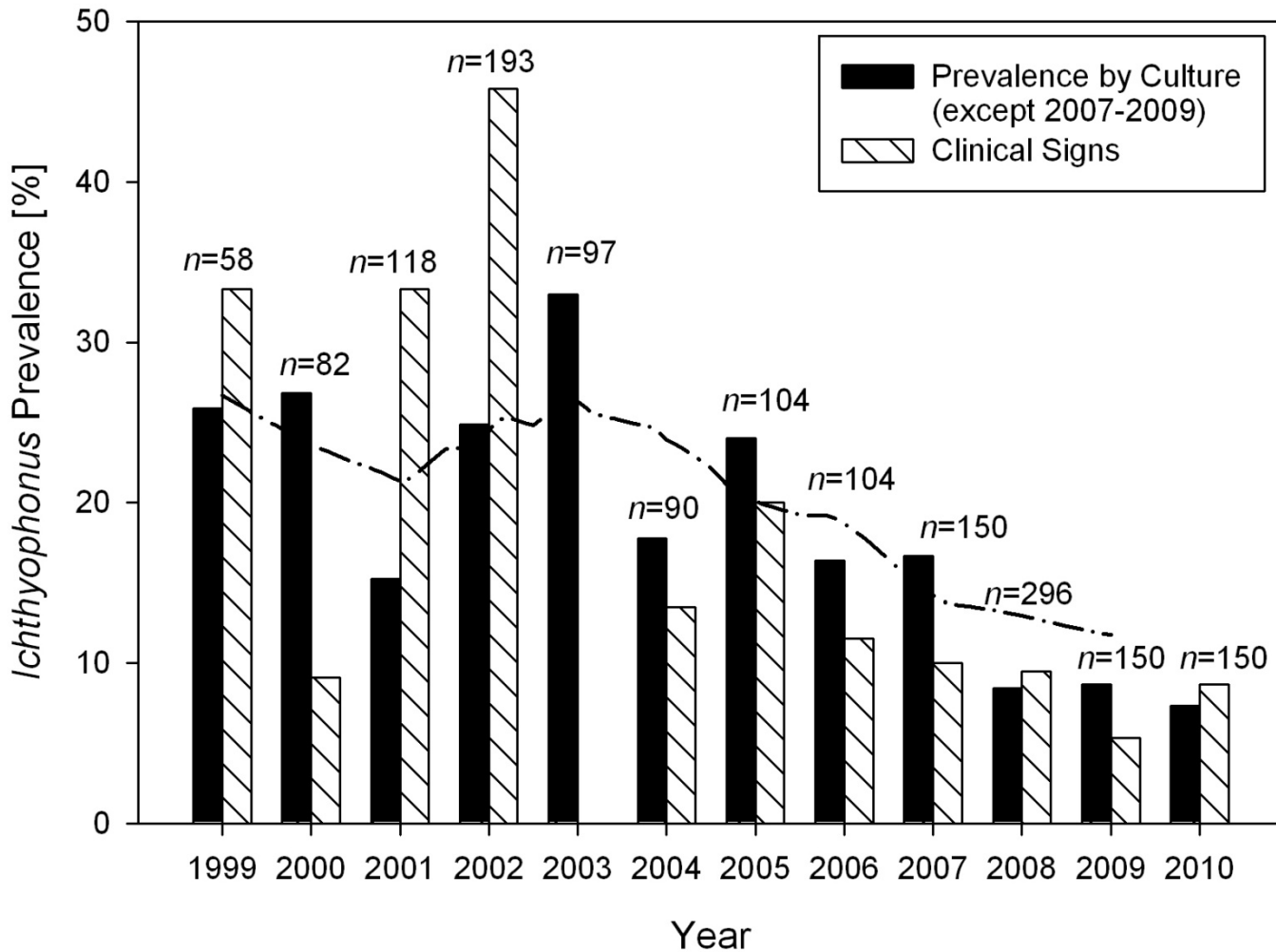
Age 5: 42.9%

Age 6: 35.7%

Unknown: 14.3%



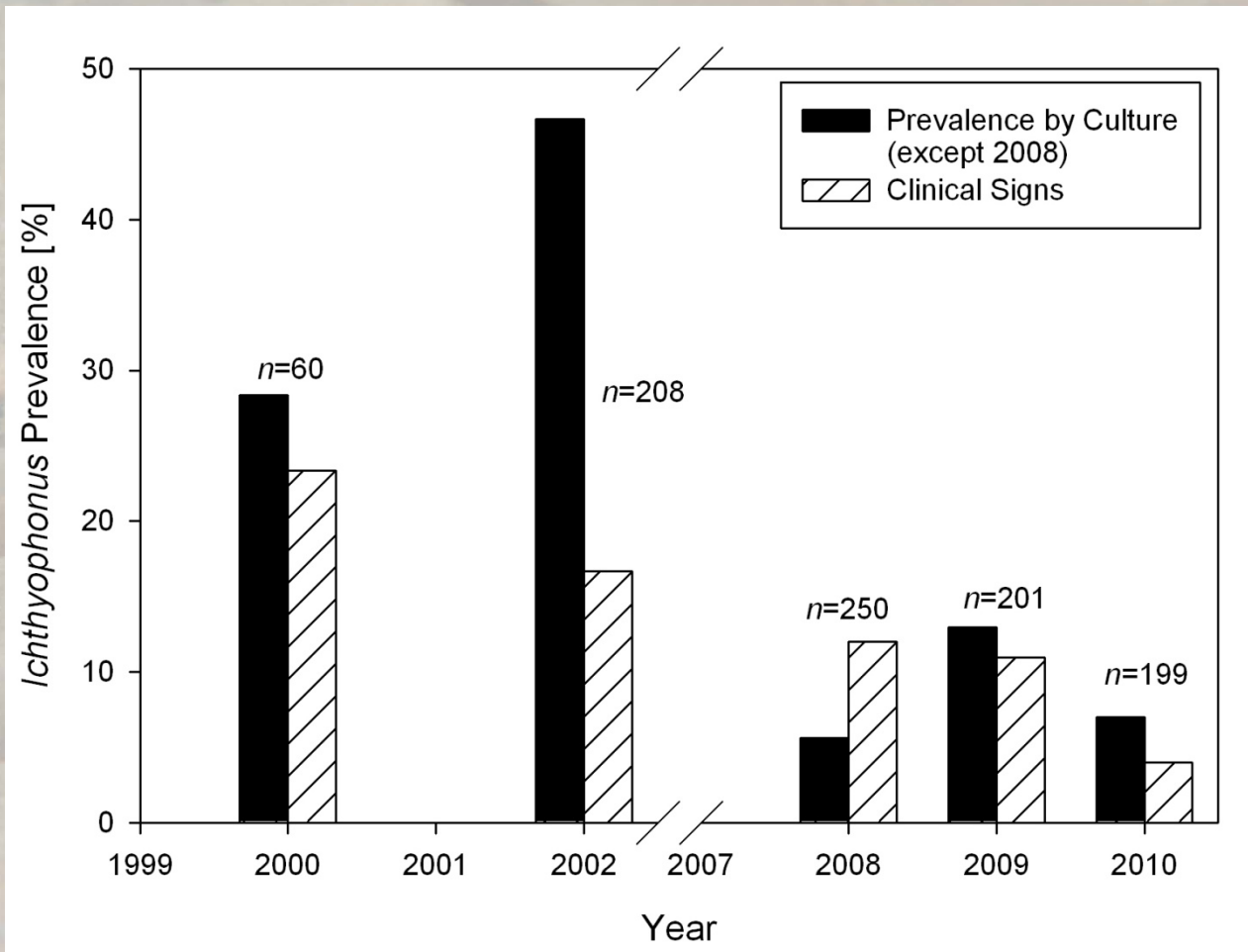
# Ichthyophonus Time Series Emmonak





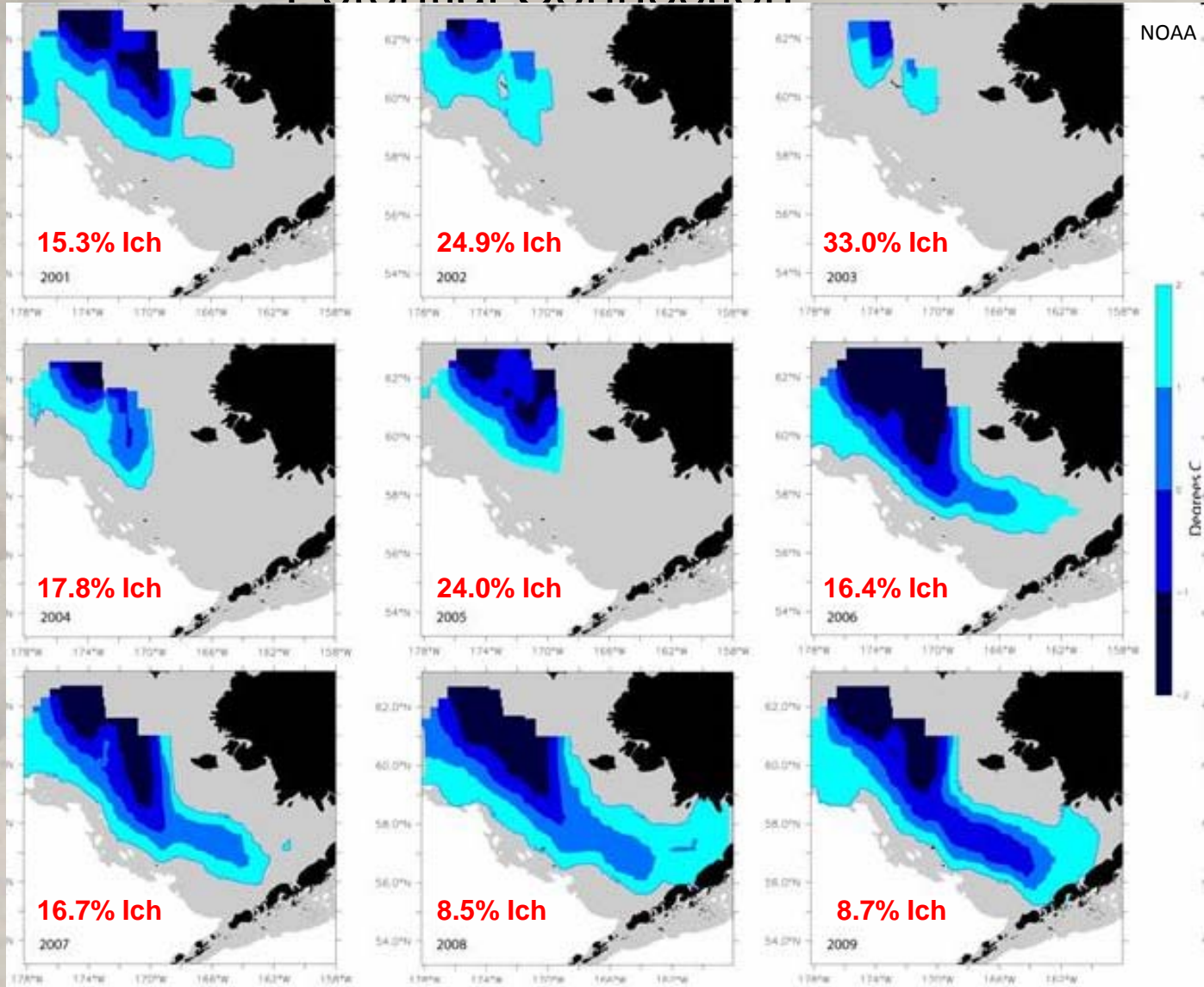
# Ichthyophonus Time Series

## Eagle



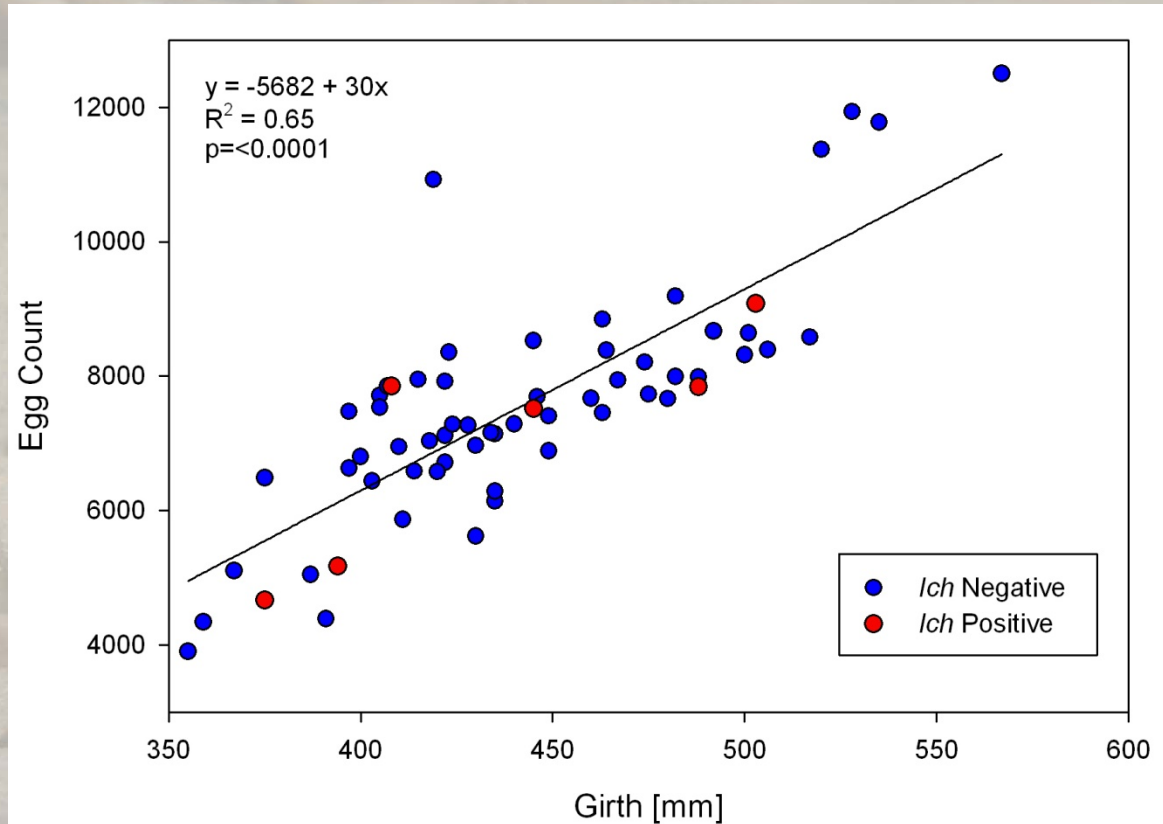
# Mooring 2 Eastern Bering Sea Temperature Data

Potential Connection?





# Fecundity - Eagle



- # of eggs per female is positively correlated to girth (less so to length)
  - But generally larger (and girthier) females have more eggs
- No obvious effect of *Ichthyophonus* on Chinook salmon fecundity (but sample size limitations)



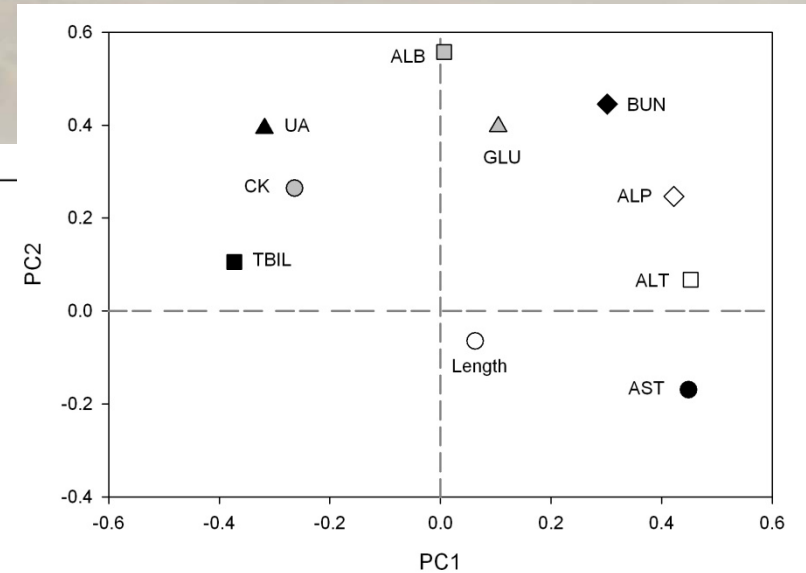
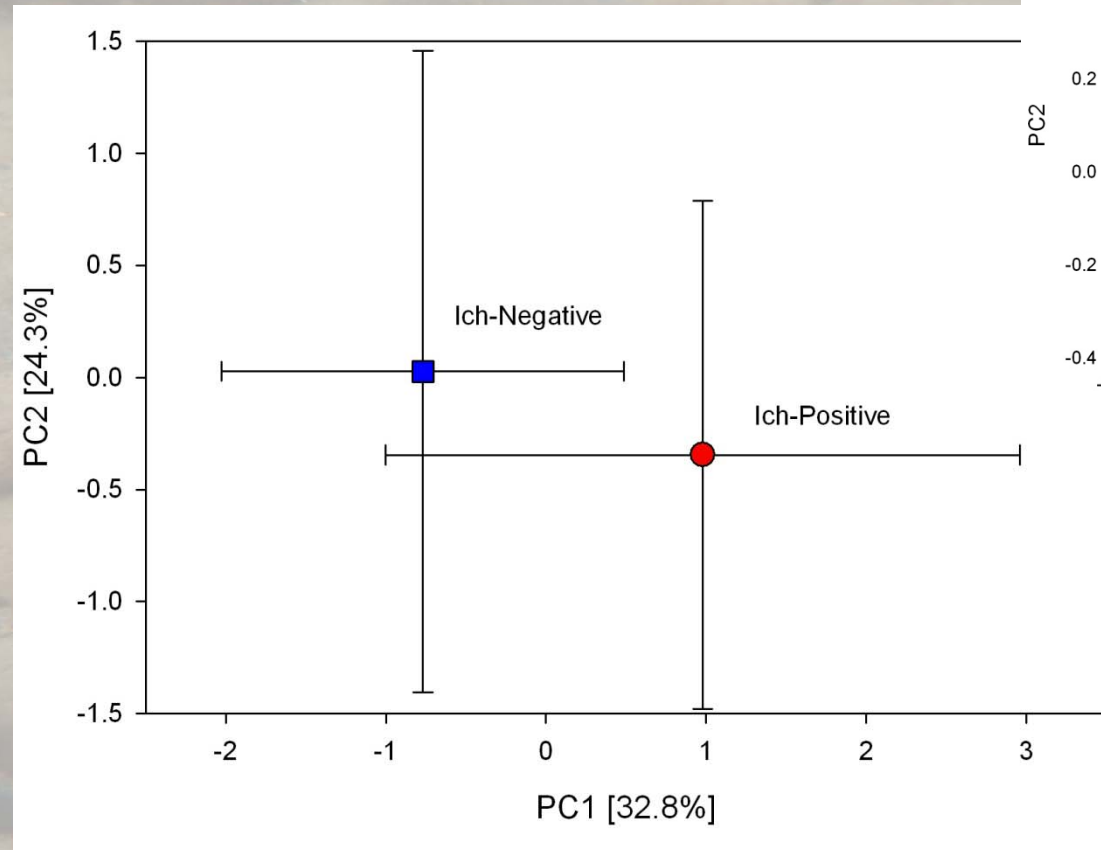
# Egg Quality - Eagle

|                     | %Water     | %Lipid      | %Protein   | Energy Density |
|---------------------|------------|-------------|------------|----------------|
| <i>Ich-</i>         | 56.9 ± 3.1 | 22.3 ± 8.1  | 20.5 ± 2.5 | 6297 ± 441     |
| <i>Ich-Positive</i> | 55.9 ± 2.9 | 33.0 ± 11.6 | 17.8 ± 3.1 | 6267 ± 305     |

- No difference in egg quality and proximate composition between “healthy” and infected females
  - But, clear sample size limitations ( $n=6$  for infected females)
- However, survival effects noticed in independent study...



# Blood Chemistry Profiles - Eagle



- Some differences in blood chem
  - Positive loading of AST, ALT, ALP, BUN
- Potential confounding factor – sample freshness!

➤ AST – indicator of liver and heart damage; ALT – liver disease and necrosis; ALP – liver necrosis; BUN – heart damage and dehydration