

# Dynamics of Piscine Orthoreovirus-1 (PRV-1) Infection During Pre-smolt Stages of Atlantic Salmon (*Salmo salar*)

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Ghebretnsae Dawit Berhe, Håkon Berg-Rolness, Stig Mæhle, H. Craig Morton, Bjørn Olav Kvamme,  
Søren Grove

Institute of Marine Research, Bergen, Norway

<sup>1</sup>Norwegian University of Life Sciences, Ås, Norway

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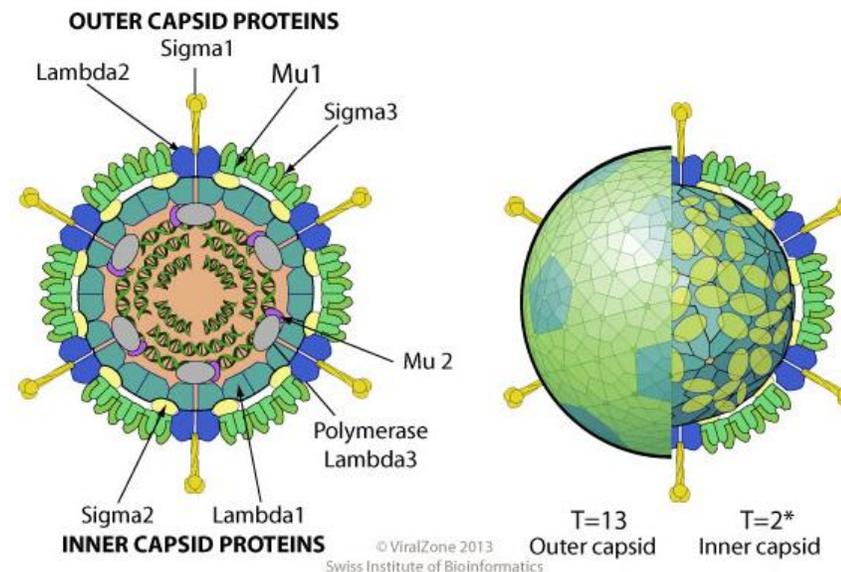
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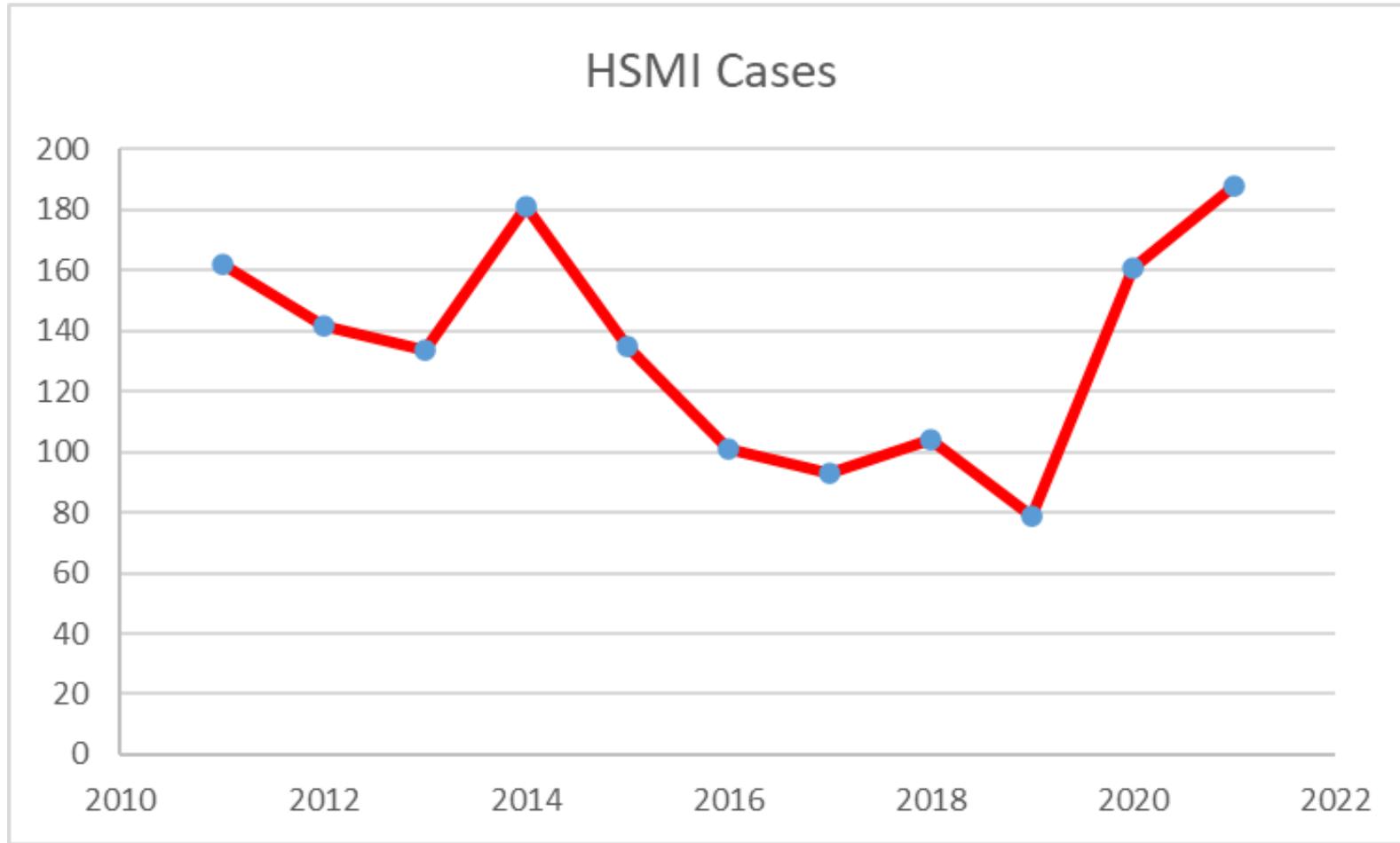
<sup>1</sup>Norwegian University of Life Sciences, Ås, Norway

# Heart and skeletal muscle inflammation (HSMI)

- HSMI is caused by Piscine orthoreovirus (PRV)
- Reoviridae - dsRNA virus with 10 genome segments
- Morbidity up to 100% and mortality up to 20%
- Erythrocytes, Epicariditis, myocarditis



# HSMI in Norway



# In this presentation:

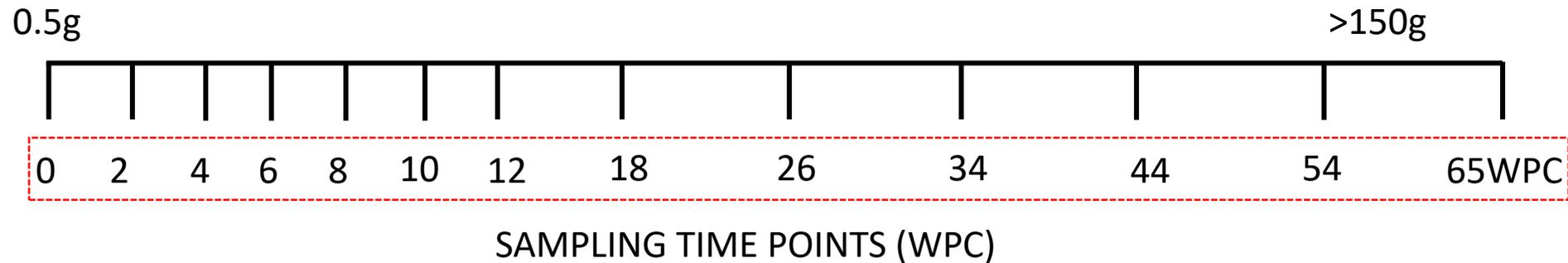
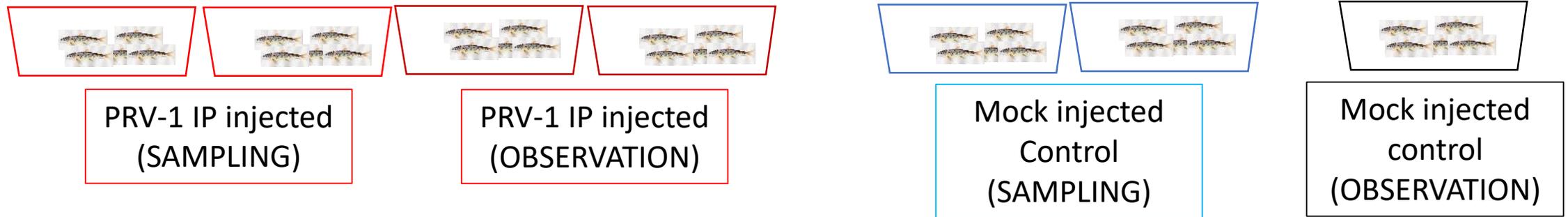
## Results (so far) from a long-term PRV1 infection experiment

- **Part I.** Infection dynamics and shedding of PRV-1 over 65 weeks
- **Part II.** Effect of stress on PRV-1 viral load and shedding
- **Part III.** Viral kinetics of SAV-3 infection in fish persistently infected with PRV-1

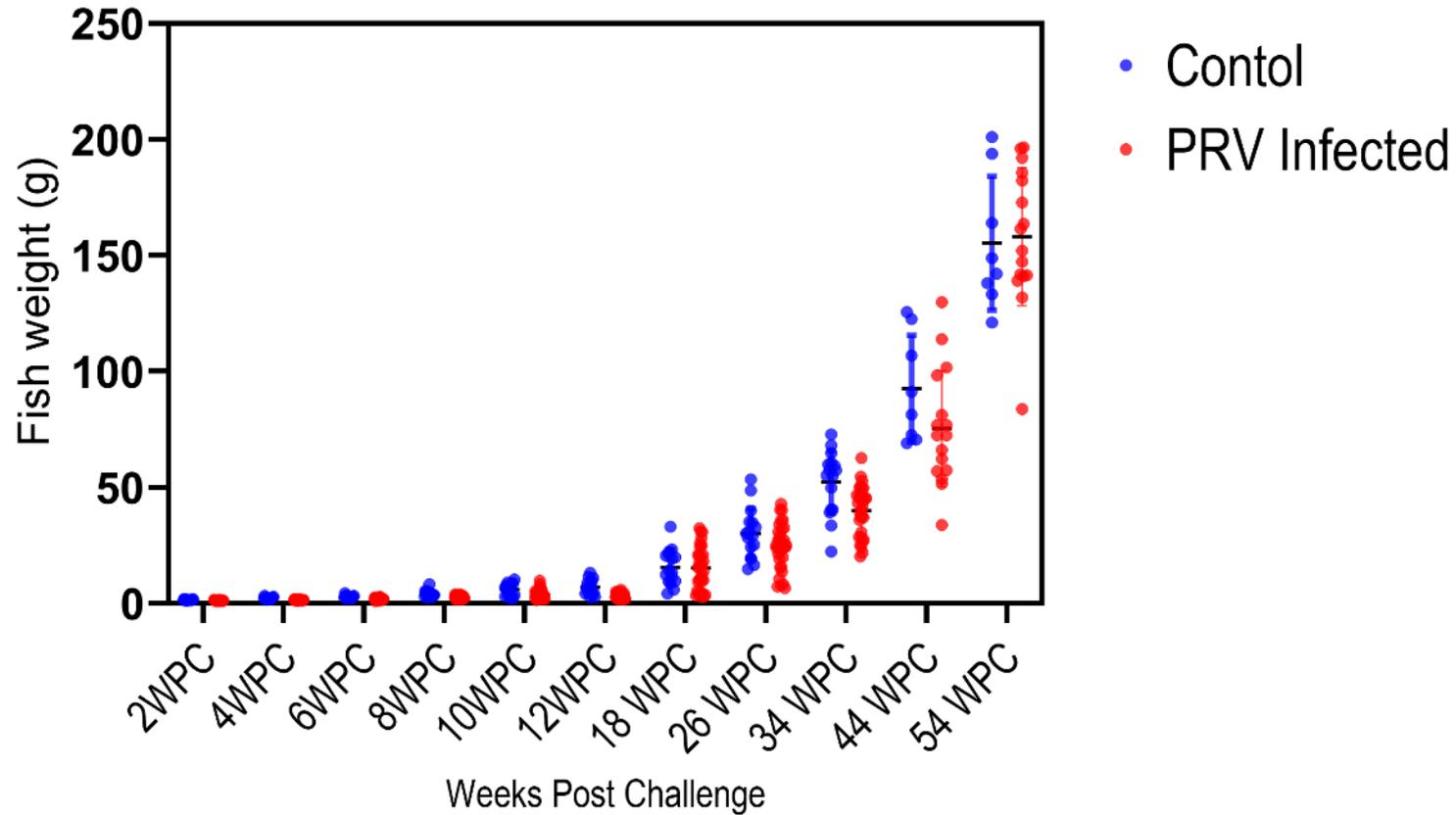
# Part I

## Infection dynamics of PRV-1 infection (in fry and freshwater)

### Experimental setup

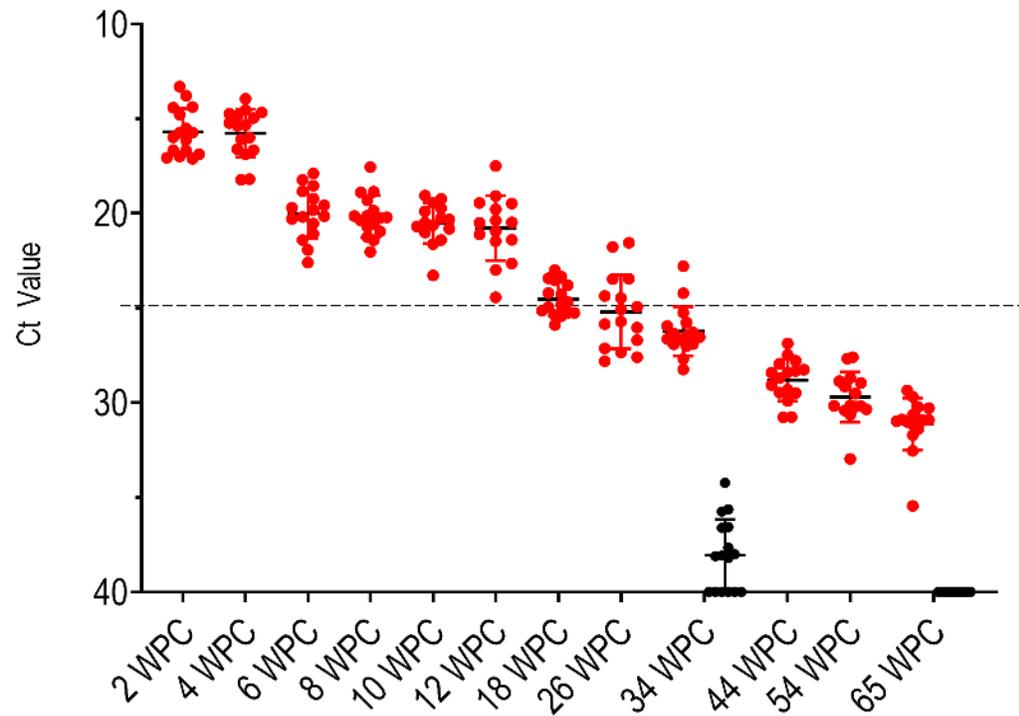


# Fish weight

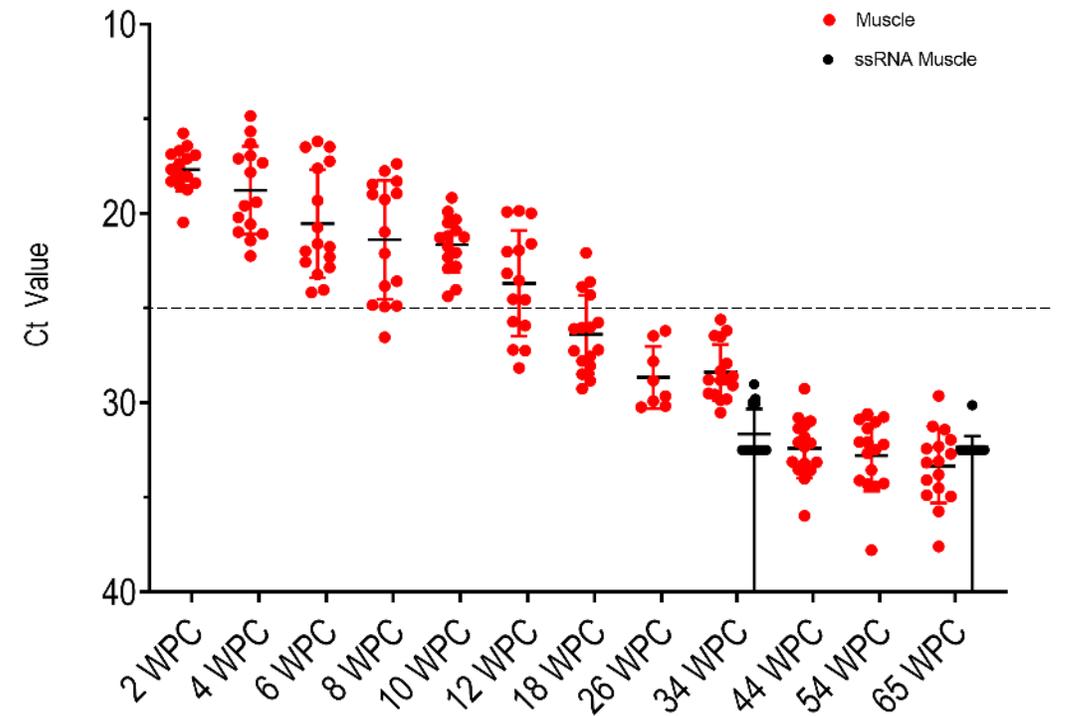


# PRV-1 Viral Load

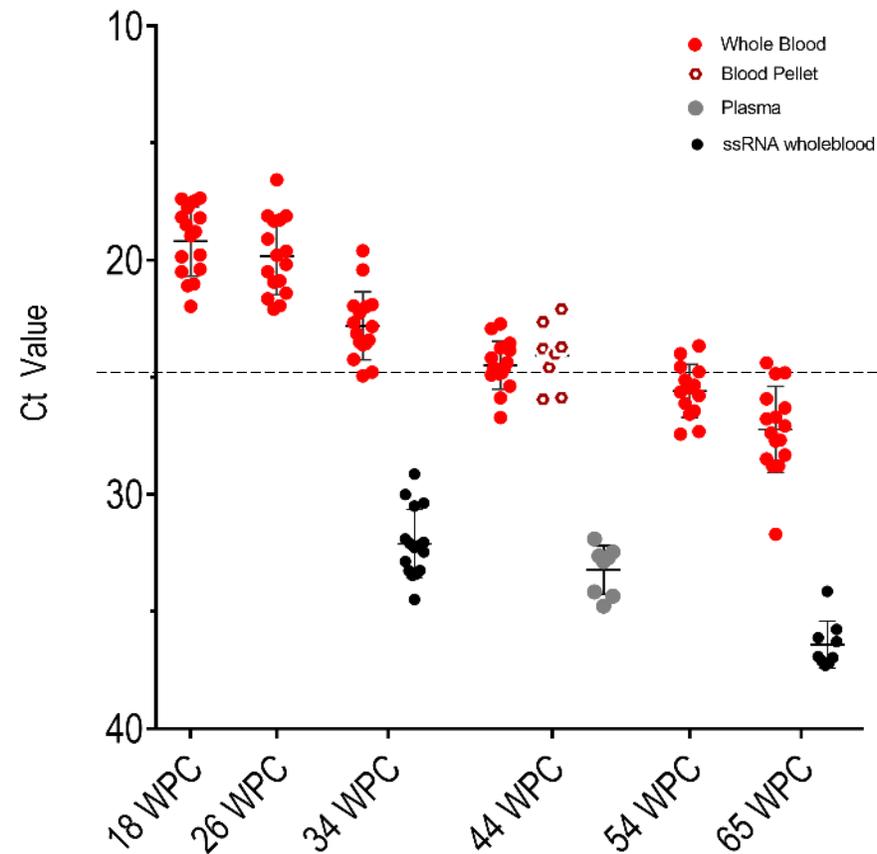
## Heart



## Muscle

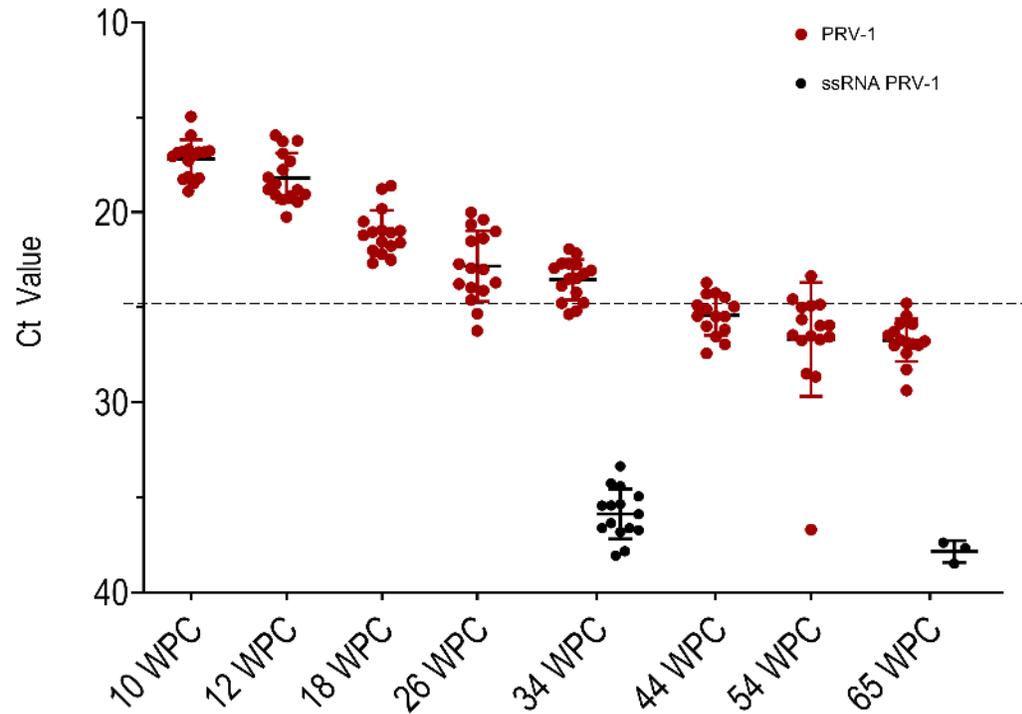


# PRV-1 Viral Load - Erythrocytes

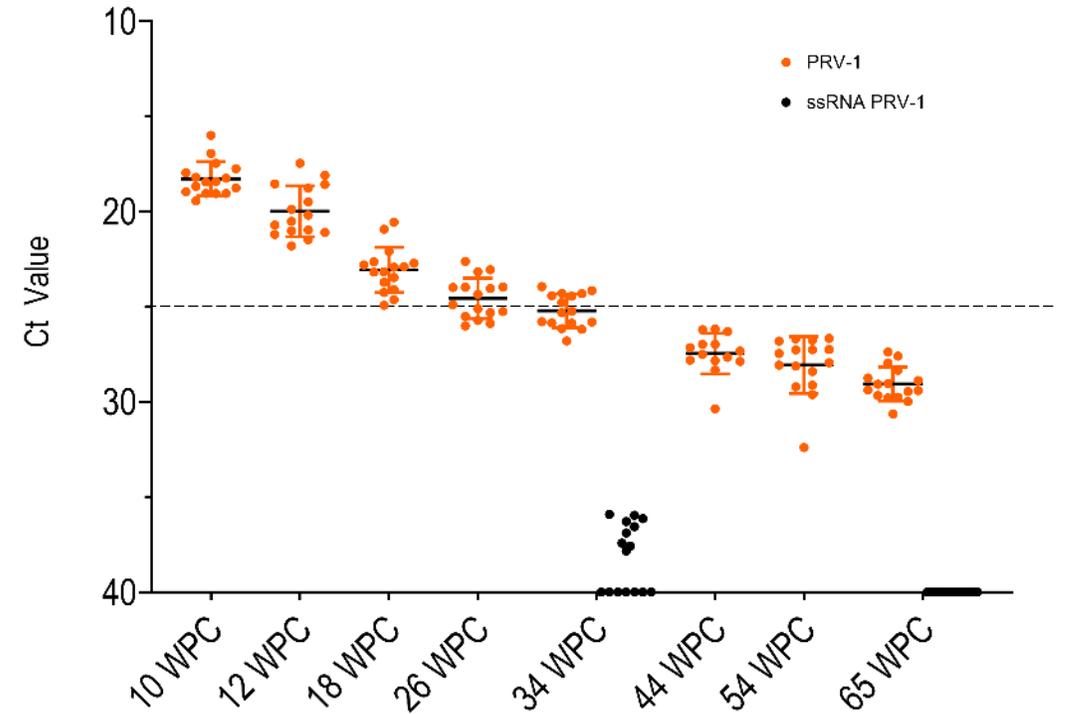


# PRV-1 Viral Load- Lymphoid organs

## Spleen

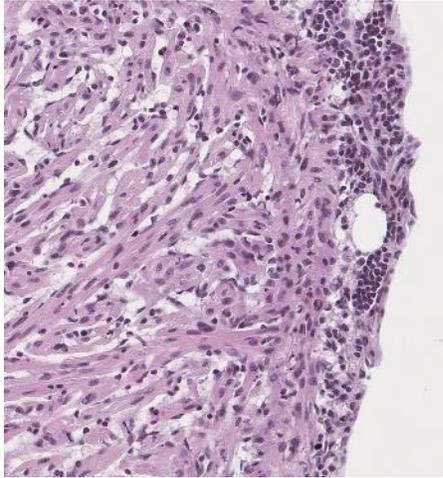


## Head kidney

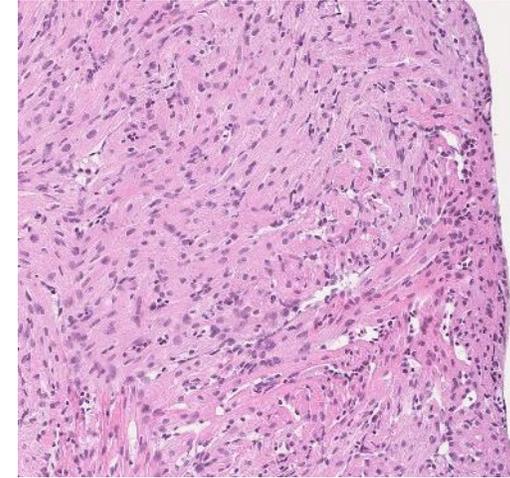


# Histopathology- Heart

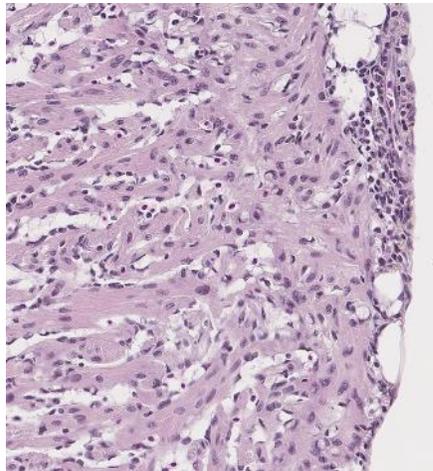
**6WPC**



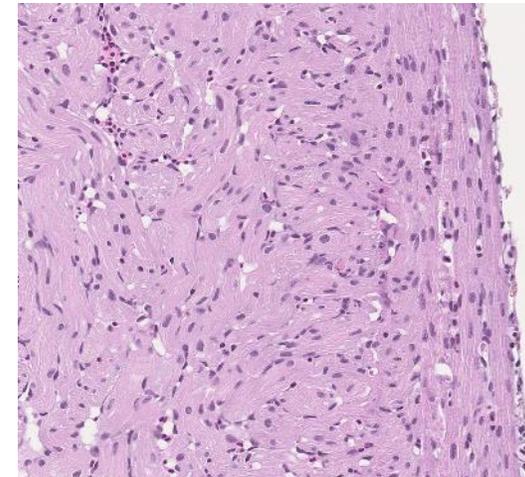
**10WPC**



**8WPC**



**18WPC**

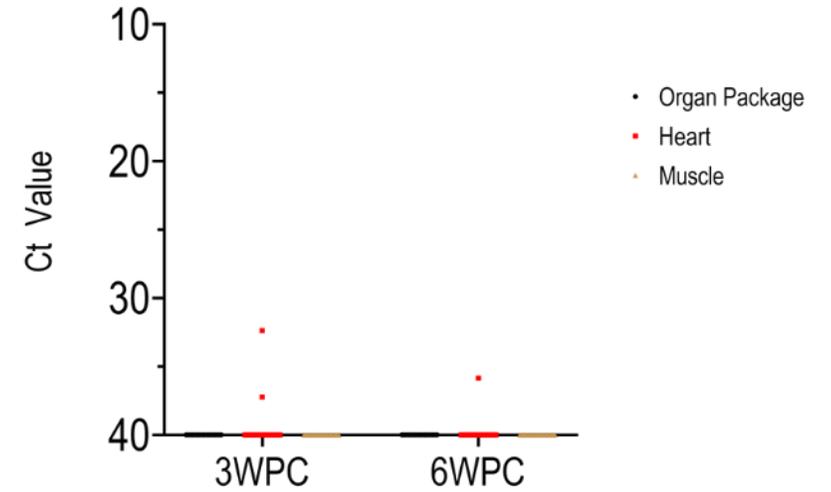


# Shedding from PRV-1 infected fish

Shedding  
@ 10WPC



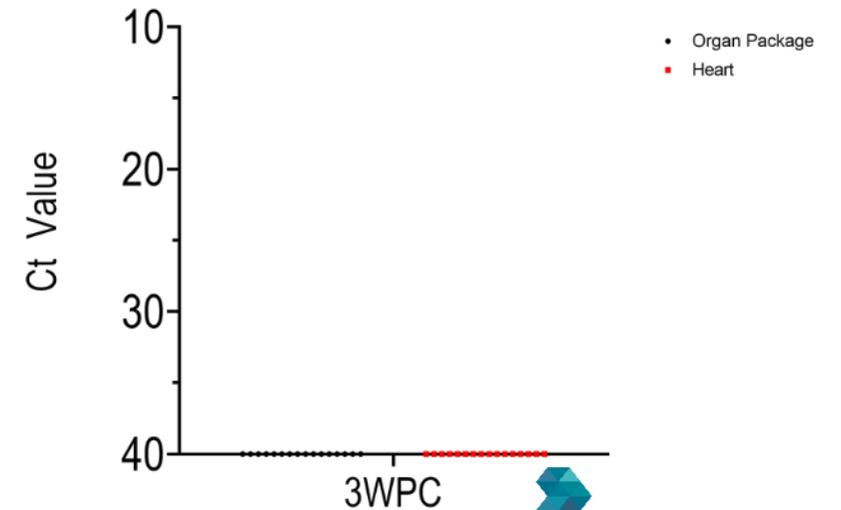
24 hrs cohabitation



Shedding  
@ 31WPC

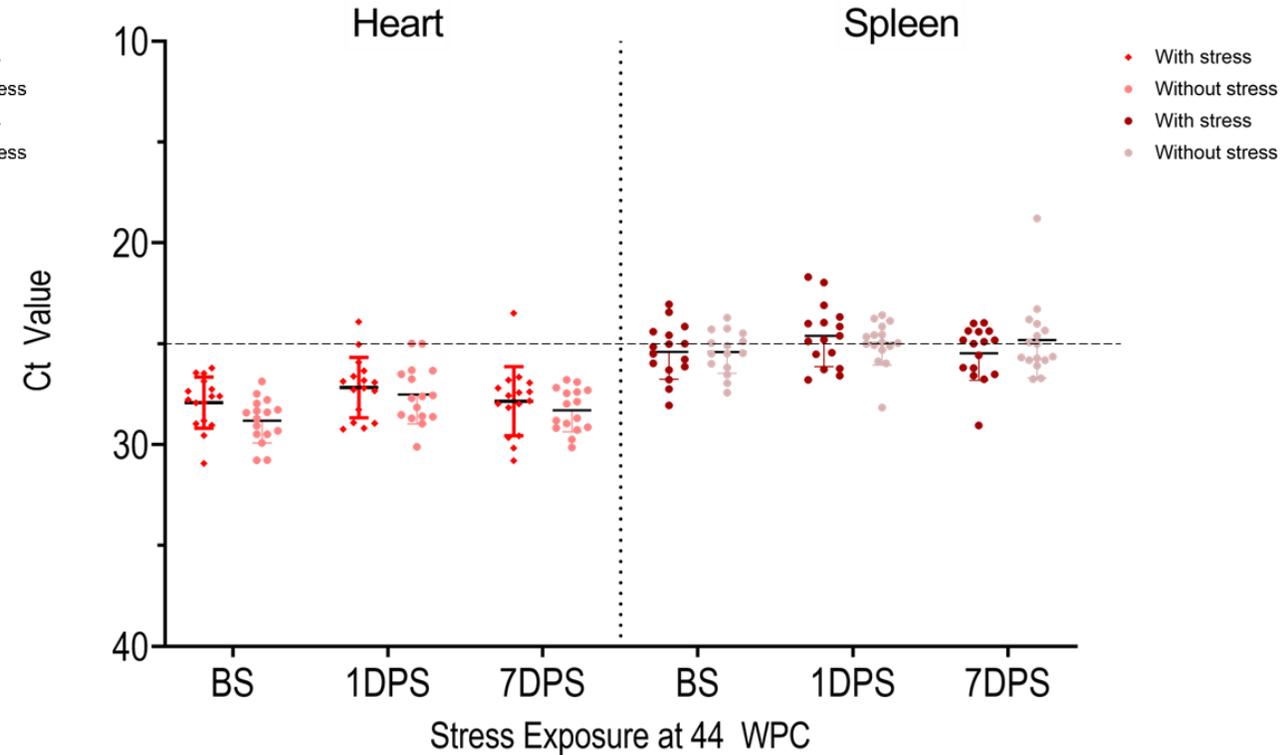
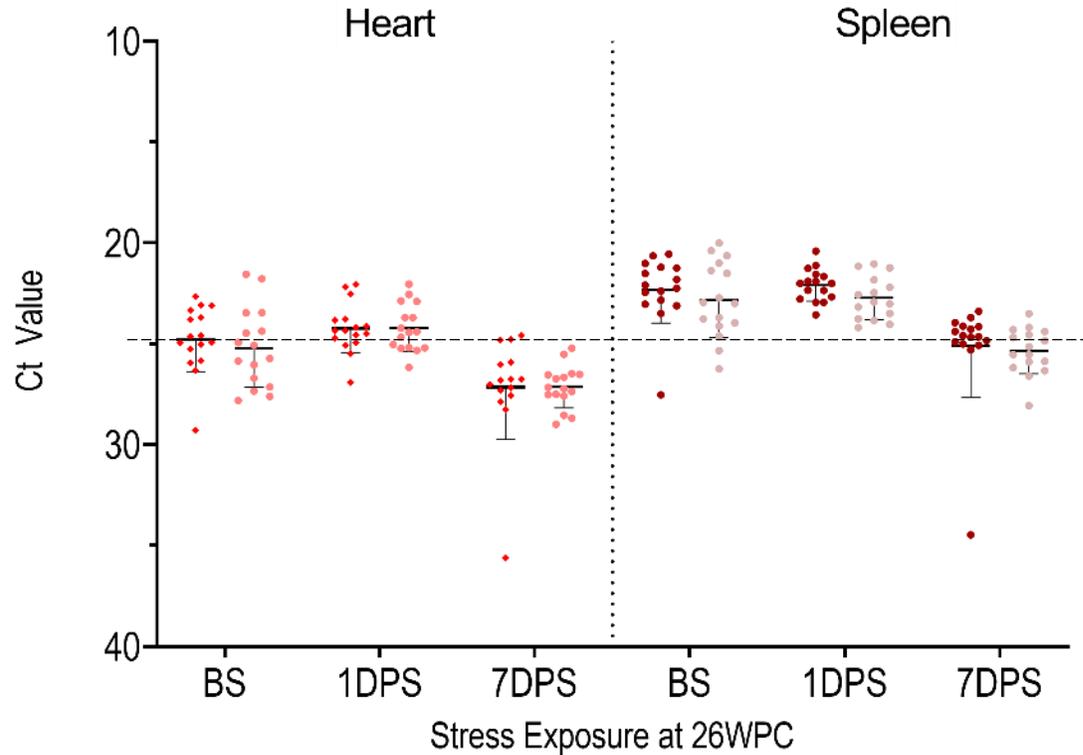


3 weeks cohabitation

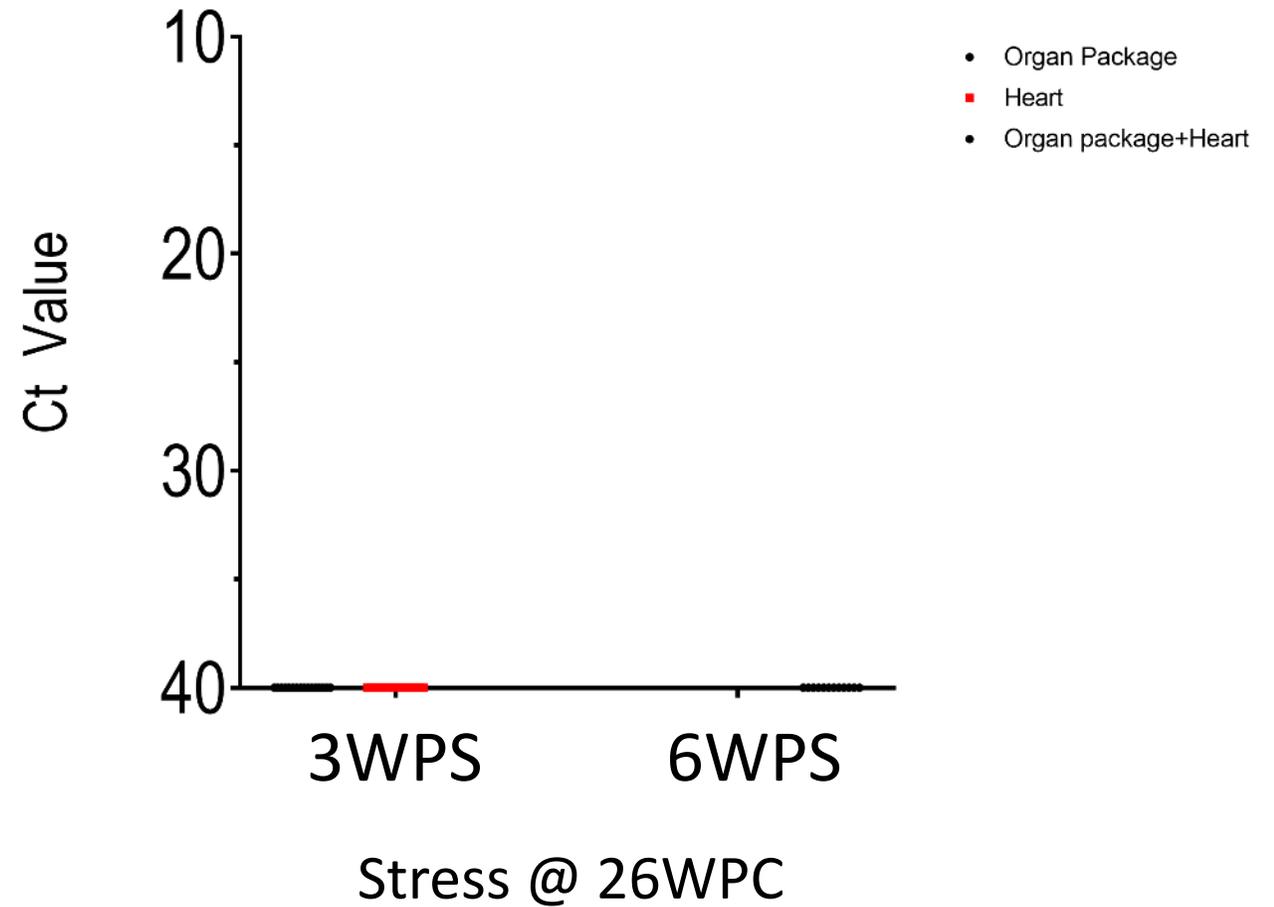


# Part II.

## Effect of stress on PRV-1 viral load @ 26WPC and 44WPC

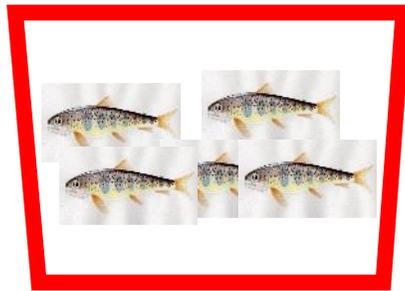


# Viral shedding from stressed PRV-1 infected fish

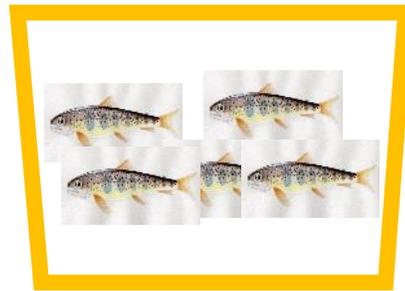


# Part III

## SAV3 superinfection of PRV-1 persistent fish @43WPC



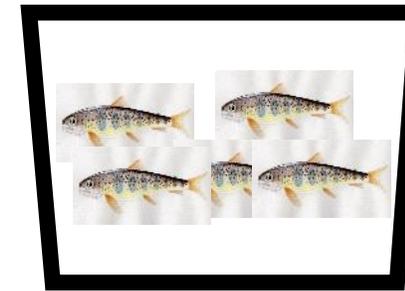
PRV



PRV+SAV3

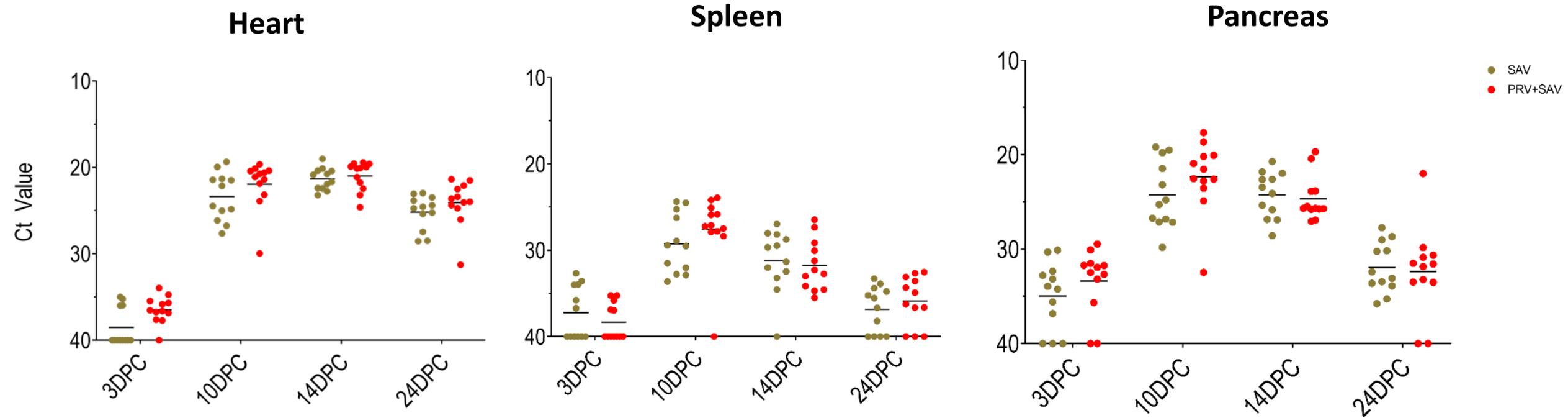


SAV3

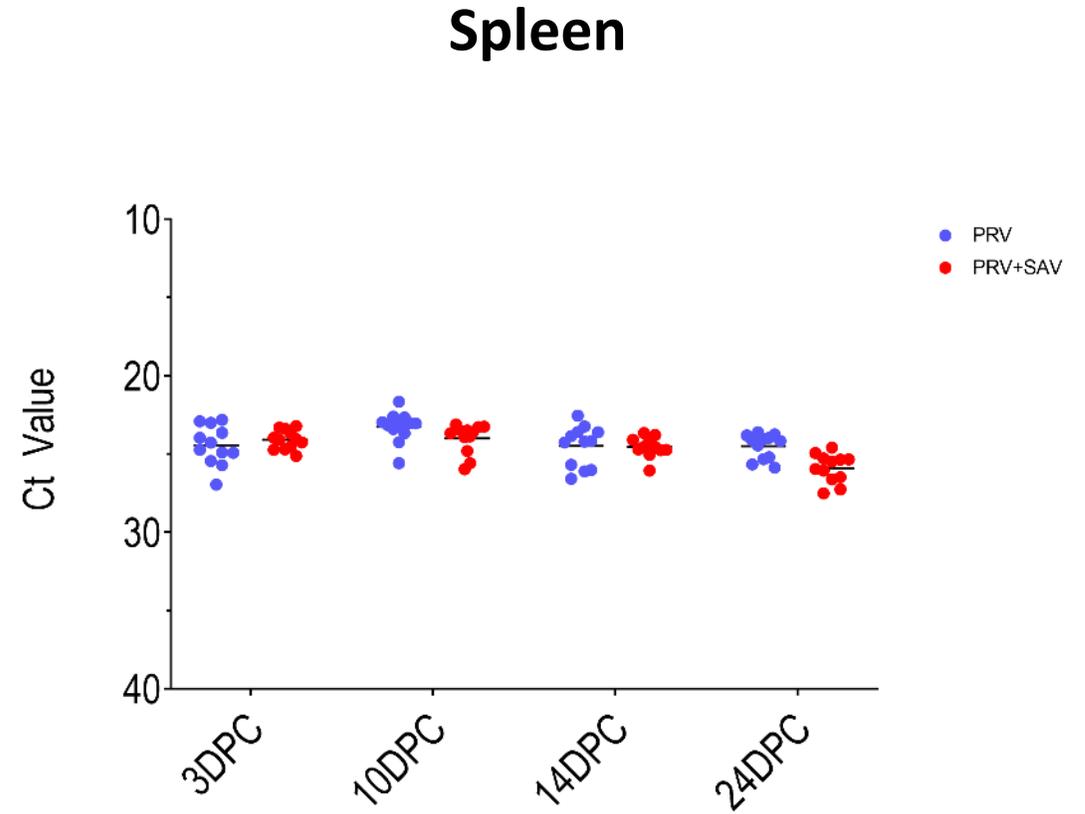
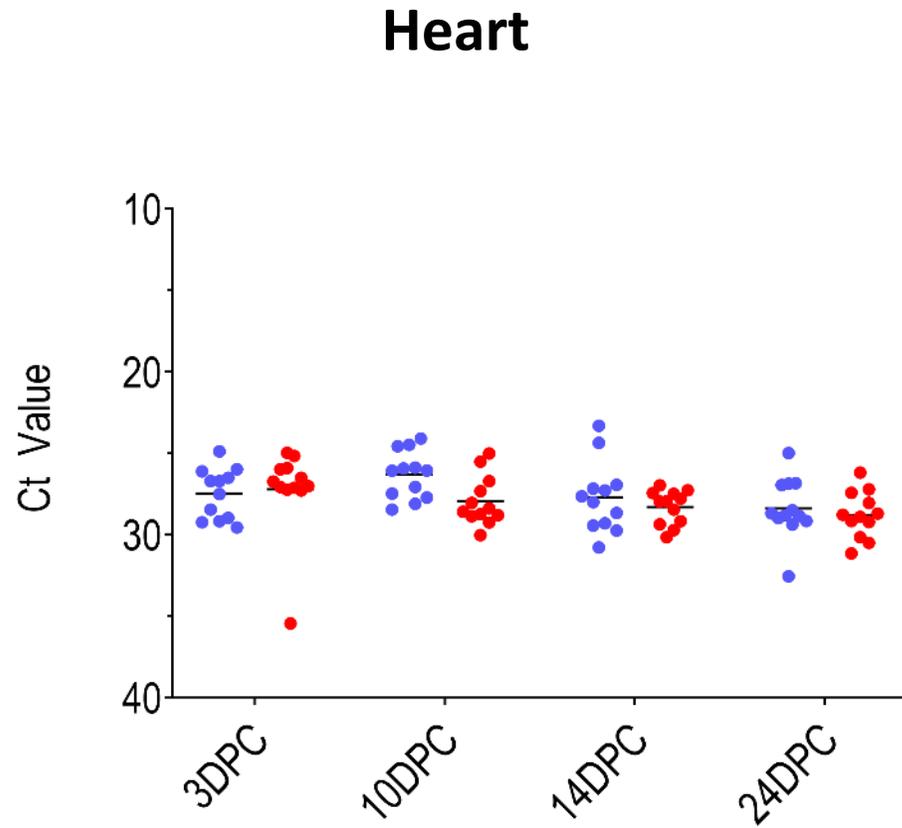


Control

# SAV3 superinfection – SAV3 viral load



# SAV3 superinfection – PRV-1 viral load



# Conclusions

- Salmon fry are a valid model for the study of PRV-1 infection
- PRV-1 persists for more than 65 weeks in erythrocytes and other organs in Atlantic salmon
- Heart and muscle tissues recovers from infection and regenerates after the inflammation
- PRV-1 infected fish show a very narrow shedding window
- Acute stress exposure does not affect the PRV-1 viral load
- Persistent PRV-1 infection does not affect the susceptibility to SAV super infection

# THANKS TO:

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