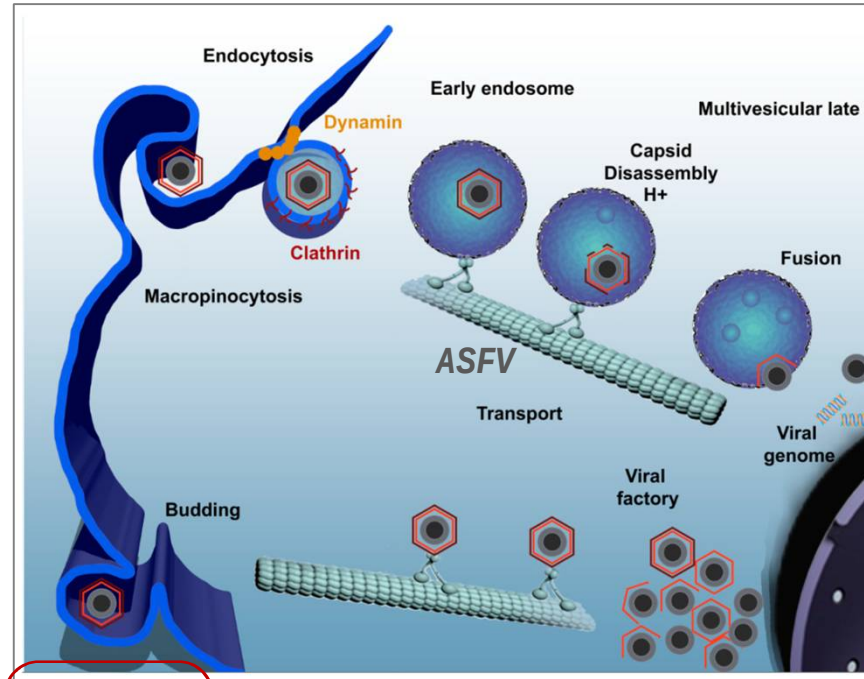
ASF VIRUS FEATURE

- Infect monocytes by endocytosis
- Only infect macrophage and dendritic cell
- Does not infect epithelial cell (gut, lung or skin)
- No neutralizing antibody
- Immunity through cytotoxic CD8 T-cell cellular response
- Increase survival
- Reduce transmission rate
- Relies on Th1 cytokine (INF-r)
- Vaccines to induce this response as well



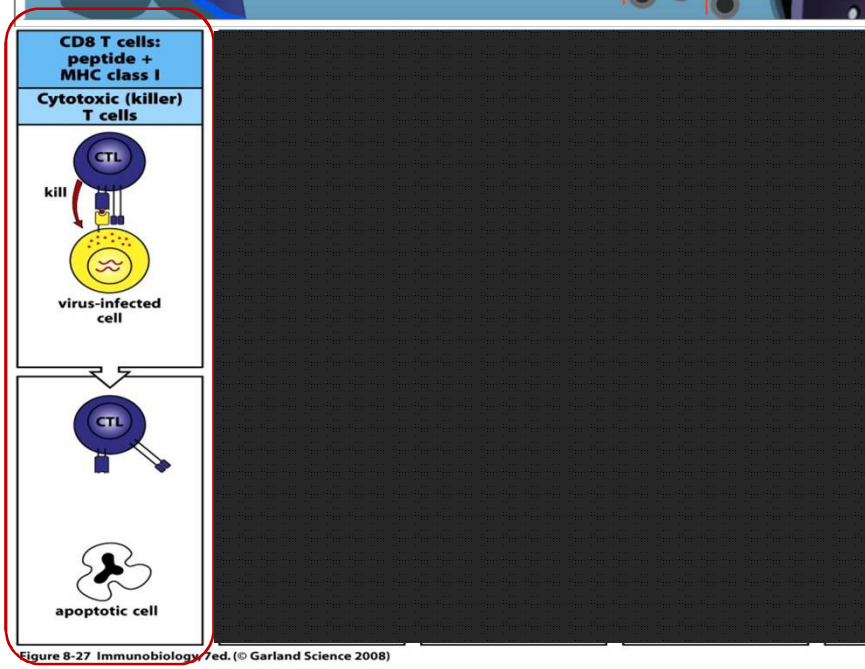


Figure 8-27 Immunobiology 7ed. (© Garland Science 2008)

BACKGROUND. STUDY #1: PIGS WERE NOT INFECTED WHEN REPEATEDLY FED WITH FEED CONTAINING LIQUID PLASMA INOCULATED WITH ASF VIRUS

STUDY CONDUCTED AT IRTA-CRESA IN 2019

PLOS ONE

RESEARCH ARTICLE

Commercial feed containing porcine plasma spiked with African swine fever virus is not infective in pigs when administered for 14 consecutive days

Elena Blázquez[1,2,3]*, Joan Pujols[1,3], Joaquim Segalés[3,4,5], Fernando Rodríguez[1,3], Joe Crenshaw[6], Carmen Rodríguez[2], Jesús Ródenas[2], Javier Polo[2,6]

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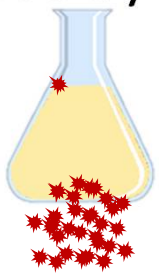
CONTAMINATED FEED PREPARATION

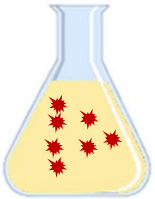
Final ASFV dose of $10^{4.3}$ $TCID_{50}$/pig/d or $10^{5.0}$ $TCID_{50}$/pig/d, study 1 or 2, respectivel
Dose confirmed by cell culture



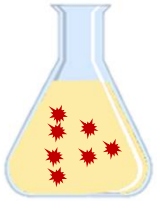
Collect serum from ASF infected pig; 5.6 mL serum with ASFV

1,000 g commercial mash feed

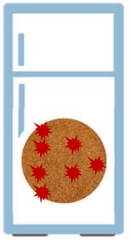
PIGS WERE NOT IN



Liquid ASF inoculum for testing

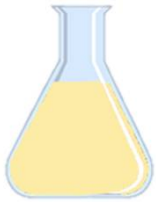


100 mL Liquid ASF contaminated porcine plasma



Mixture of feed and liquid ASF plasma stored at 4˚C for 24 h

110 g c
contamin
fed to p
overnig
Pigs wer
contamin
for 14 co
da



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20K VIRUS PARTICLES OF ASFV FED DAILY FOR 14 D

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k				
20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k				
20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k				
20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k				
20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k				
20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k				
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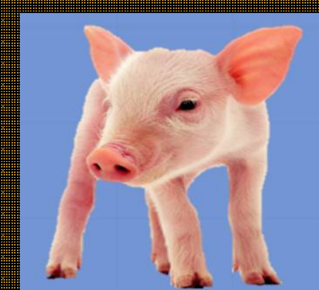
20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k				
20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k	20k				

DURING OBSERVATIO
PIGS RECEIVED ZERO
PARTICLES OF ASFV
IN FEED FOR 5 D

ALL PIGS REMAINED
HEALTHY THROUGH D



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ALL PIGS HEALTHY & FREE OF SYMPTOMS THROUGH DAY 19 AS CONFIRMED BY
TISSUE ANALYSIS (2 PIGS) ON D 19 AND BY BLOOD ANALYSIS – NO INFECTIVE AS
DETECTED.

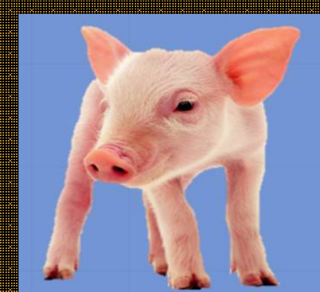
100K VIRUS PARTICLES OF ASFV FED DAILY FOR 14 D

ONE PIG DIED ON D 22 DUE TO UNRELATED REASONS AND CONFIRMED TISSUE NEGATIVE FOR ASFV. ALL OTHE
IGS WERE HEALTHY & FREE OF SYMPTOMS THROUGH DAY 23 AS CONFIRMED BY BLOOD ANALYSIS – NO
NFECTIVE ASFV DETECTED.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k								
100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k								
100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k								
100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k								
100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k								
100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k								
100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k								
100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k								
100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k								
100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k	100k								

DURING OBSERVATION PIGS
RECEIVED ZERO PARTICLES OF A
DAILY
IN FEED FOR 9 D

NO PIGS WERE INFECTED WITH A



BACKGROUND. STUDY #2: EFFECT OF SPRAY DRIED PLASM
N PIG DIETS UNDER ASFV CHALLENGE CONDITION
STUDY CONDUCTED AT IRTA-CRESA IN 2020

OBJECTIVE: To study the potential benefits of using SDPP in pig diets during ASFV infection

Could SDPP help to decrease ASFV transmission?

TIMELINE

naïve pigs

-4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

Two Pigs Inoculated with ASFV (103.0CGE)

Blood/NS/RS

Reintroduction Trojan

Blood/ NS/RS

End Trojan

NS/RS

Blood/ NS/RS

NS/RS

Blood/ NS/RS

Three Pigs Inoculated with ASFV (103.0CGE);

Stay in the pen until they naturally died

NS/RS

Blood/ NS/RS

NS/RS

Euthaniz

Tissu

NS: Nasal Swab

RS: Rectal Swab

- **Group A: 8% SDPP**
- **Group B: Control Feed**

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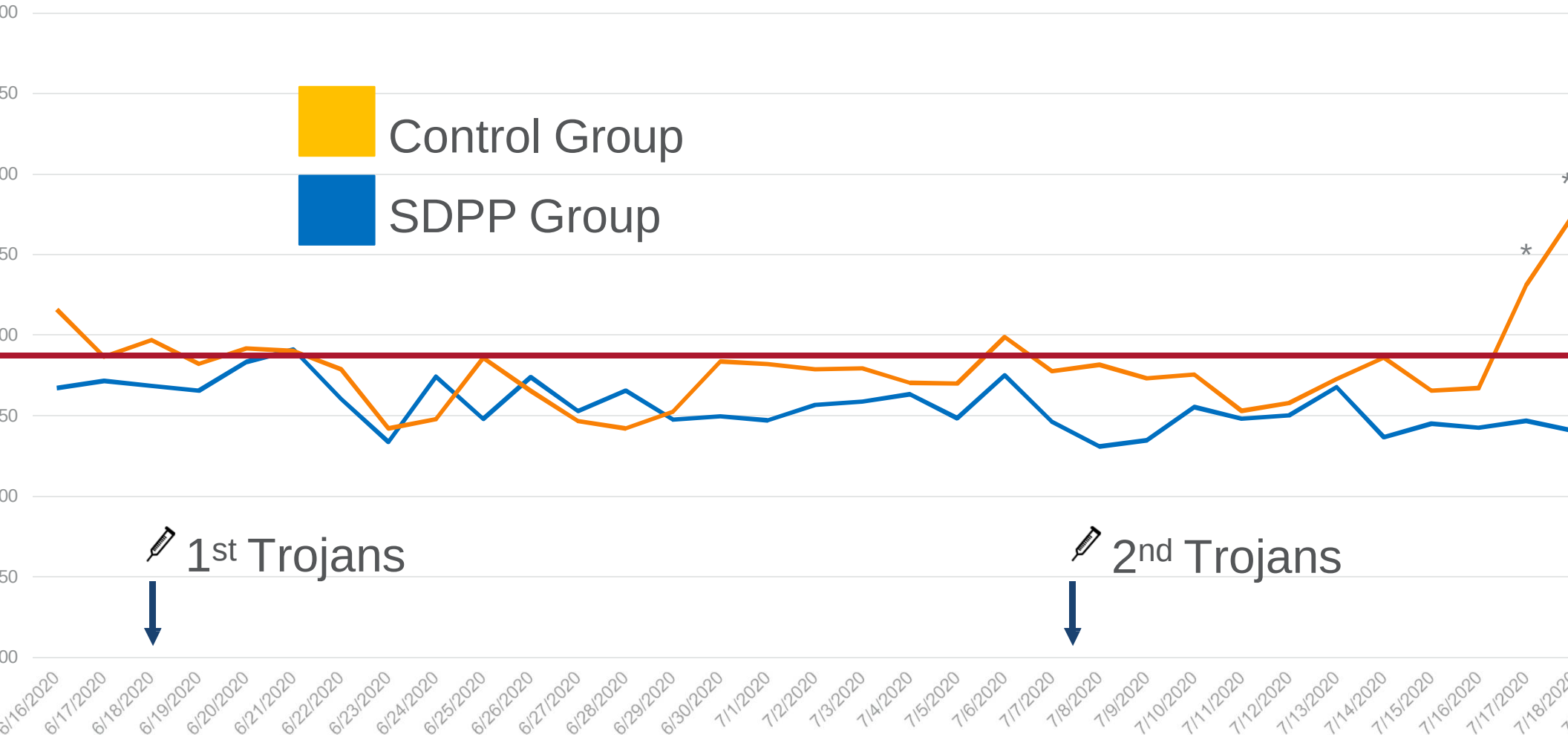
AVERAGE RECTAL TEMPERATURE



#=P<0.1; *=P<0.05; **=

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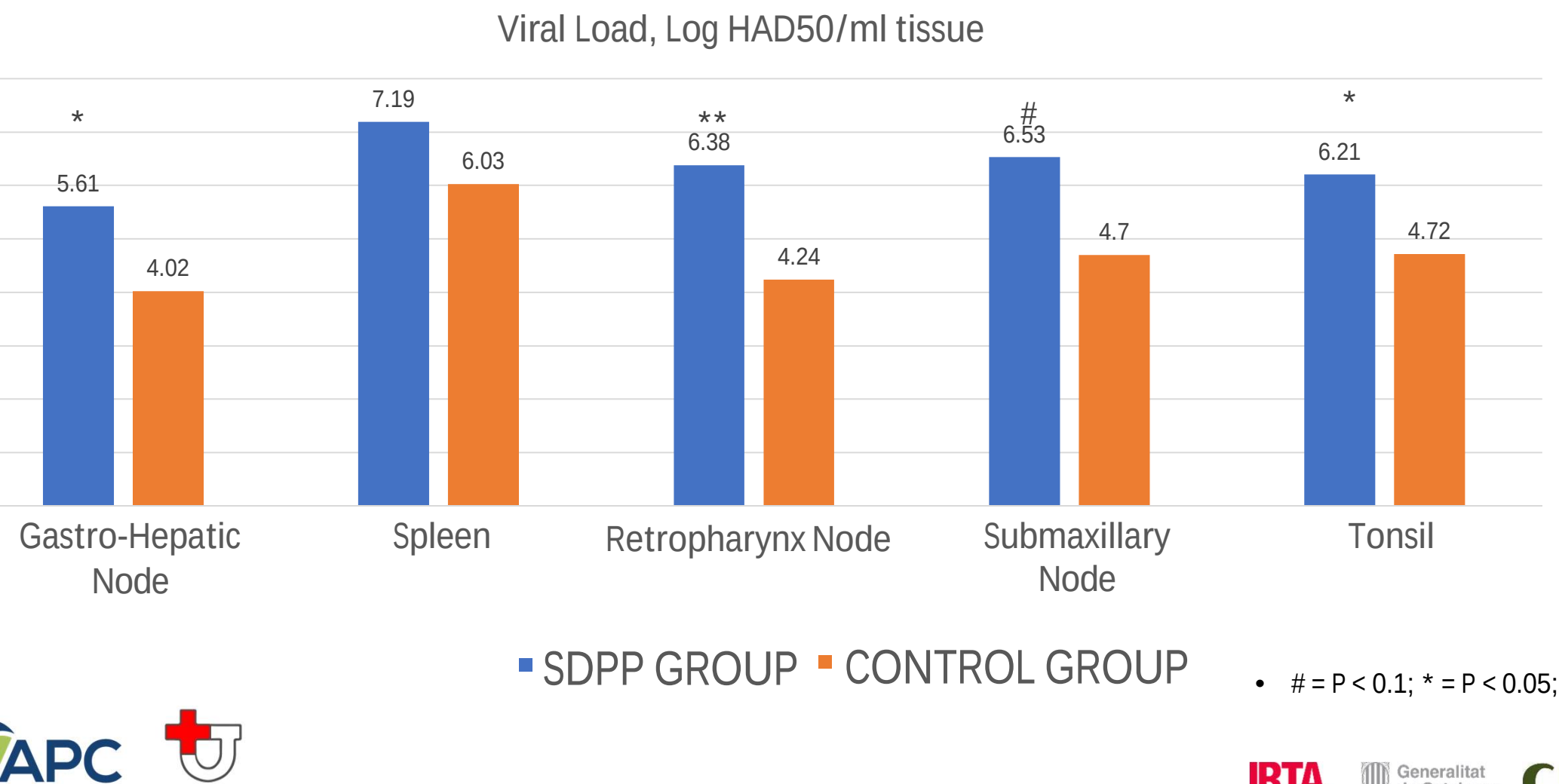
IRTA

Generalitat de Catalunya

AVERAGE ASF VIRAL LOADS



- # = P < 0.1; * = P < 0.05; **

BIOASSAY TO STUDY THE EFFECT OF FEEDING SDPP IN PIGS ON THE EFFICIENCY OF SPECIFIC ASFV VACCINE

STUDY CONDUCTED AT IRTA-CRESA IN 2021

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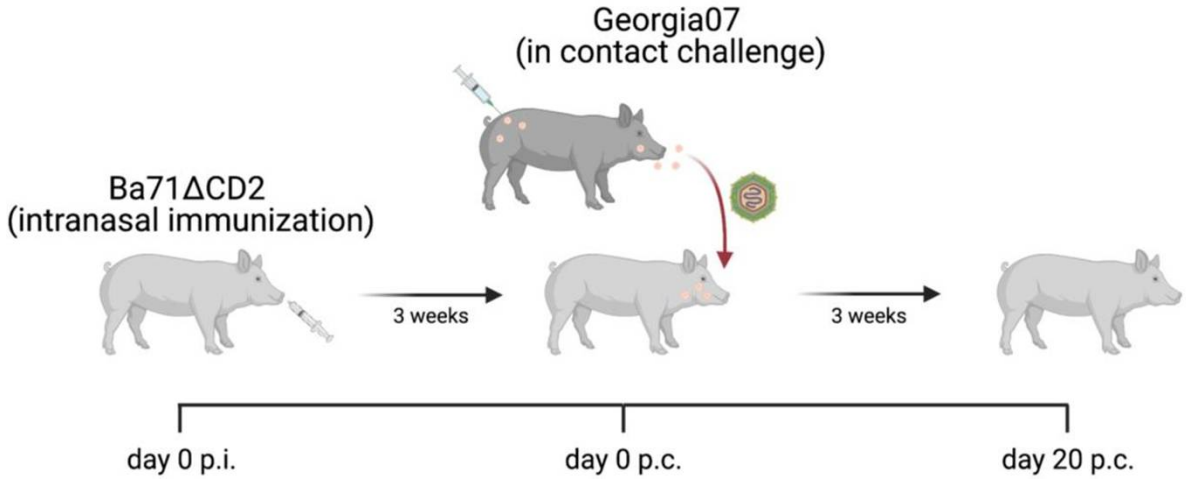
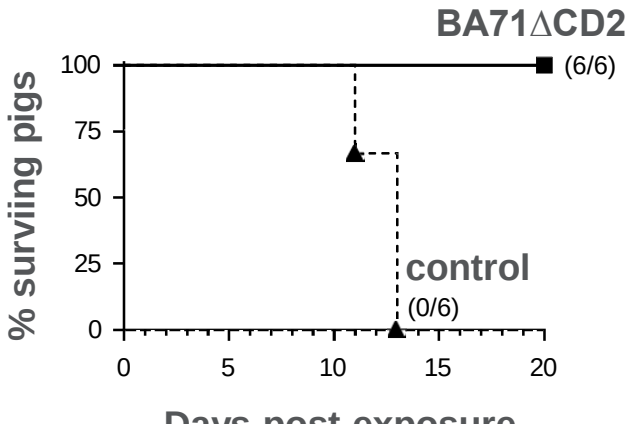
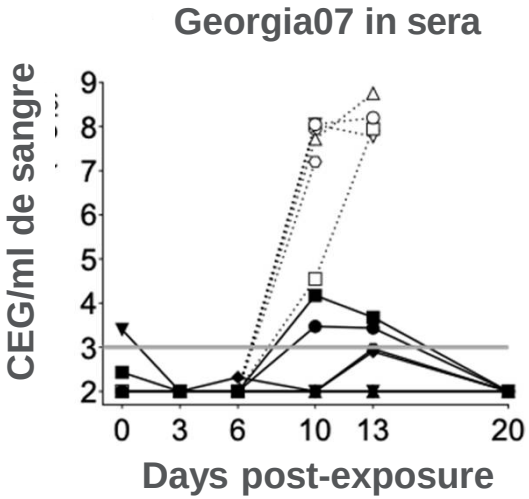
OBJECTIVES

The objective of this study is to evaluate the effect of feeding SDPP to pigs before and after vaccination against African swine fever (ASF) and subsequently exposed to pigs infected with ASFV Georgia 2007/01 on viremia.

BA71ΔCD2-intranasal inoculation protects aga
n contact ASFV challenge







EXPERIMENTAL DESIGN

Two experimental treatments, eight pigs each, 24 d old, barrow/gilt.

- Control diet
- Spray Dried Porcine Plasma (SDPP) diet, 8%.
- Because of limited time available in the CReSA facility, acclimation to dietary treatment was initiated at a research facility outside of CReSA, 14d.

All pigs were vaccinated with ASFV vaccine (BA71CD2) 10 d after entry into CReSA.

Natural ASF exposure.

- Eight not vaccinated additional pigs, consuming the Control diet, were injected with ASFV Georgia 2007/01.
- 2 days after injection 4 pigs were introduced into each pen exposing by contact the experimental pigs to ASFV.

Experimental pigs were euthanized 21 d post exposure.

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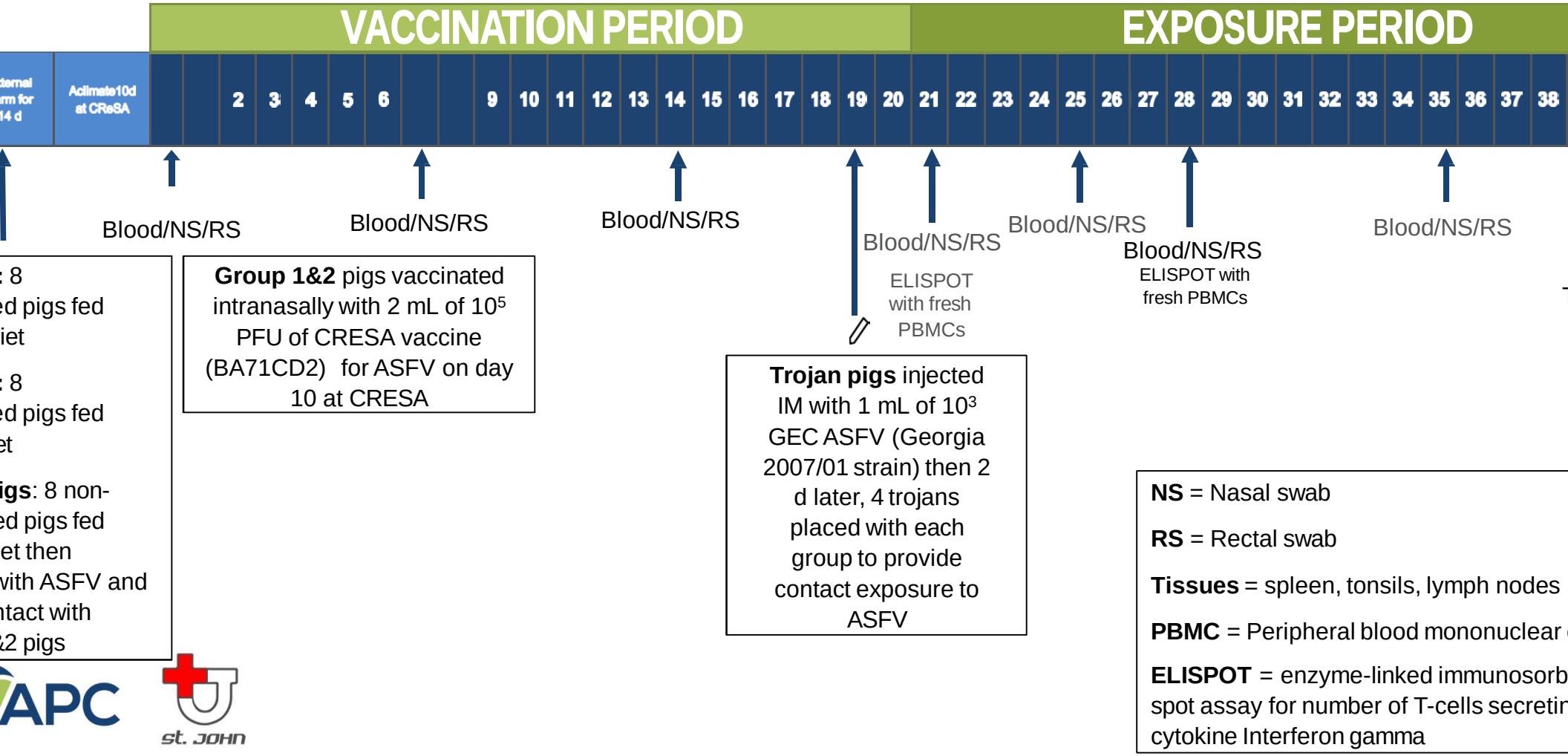
EFFECT OF FEEDING SDPP TO ASFV VACCINATED PIGS EXPOSED TO ASFV

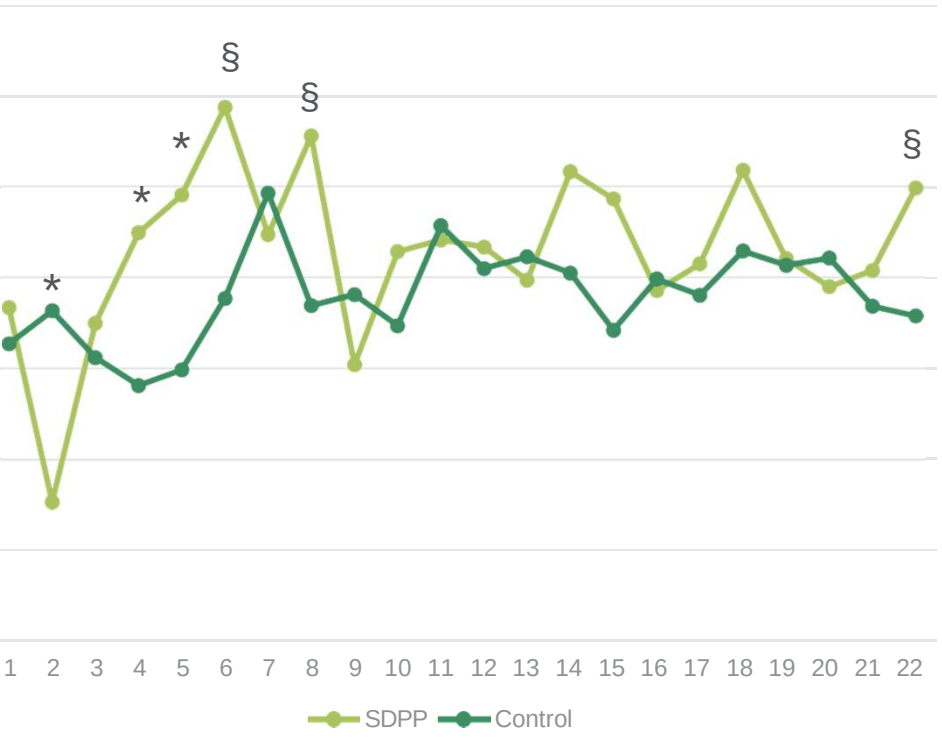
STUDY PROTOCOL



TEMPERATURES: CONTROL vs SDPP

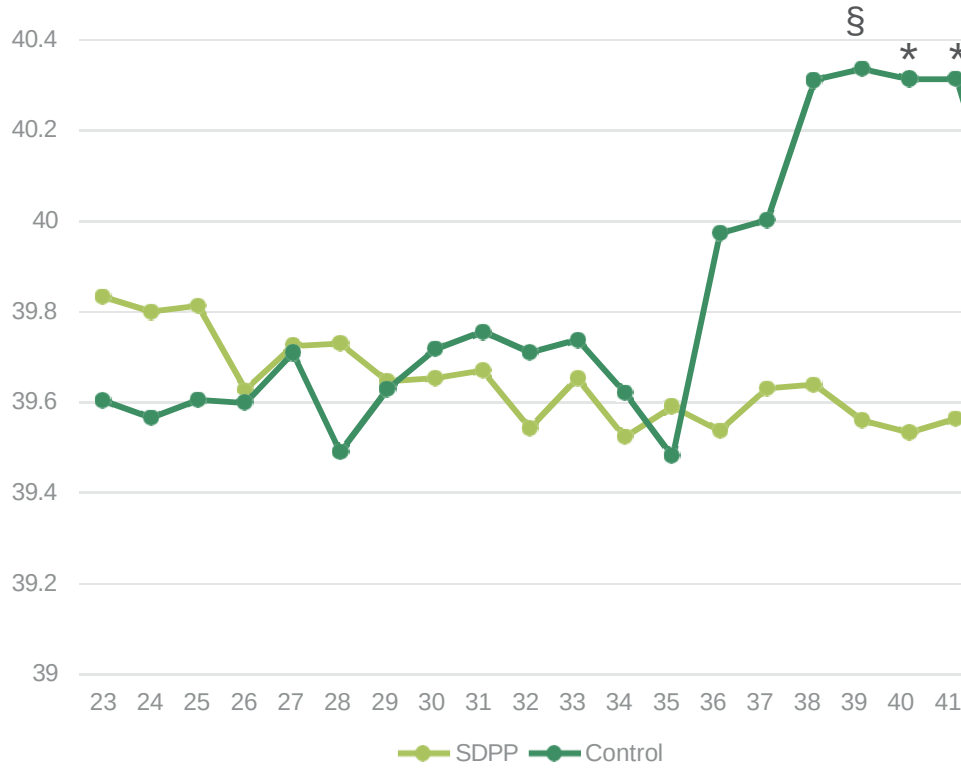
AVERAGE TEMPERATURE OVER TIME

Temperature, Vaccine Period



P = 0.0563

Temperature, Exposure Perio

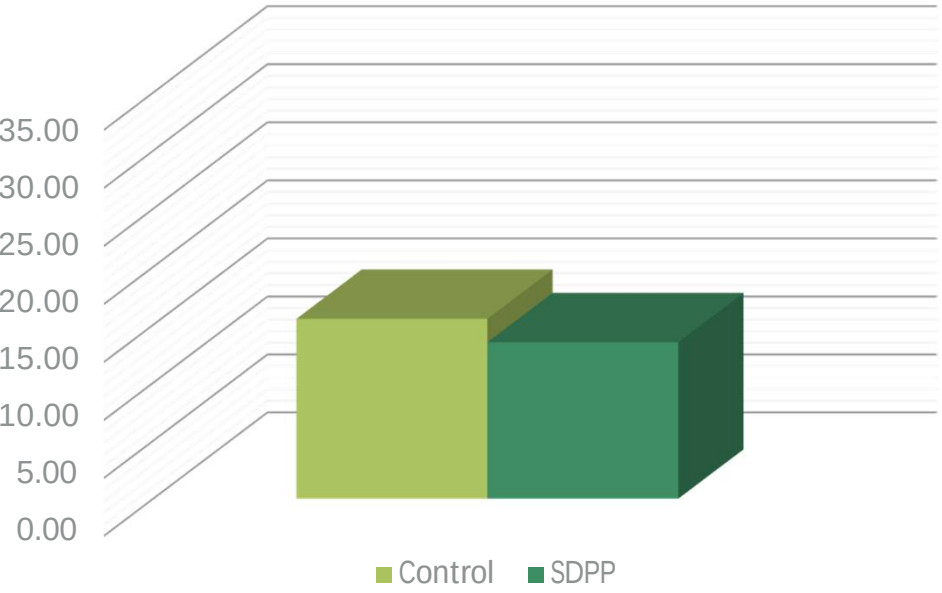


P=

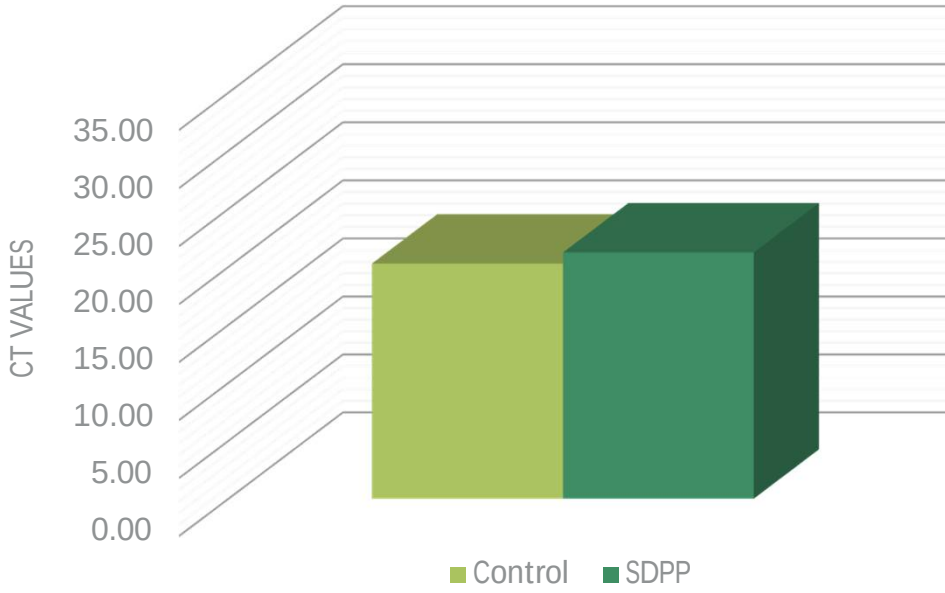
** = P < 0.05; § = P < 0.10*

EVOLUTION OF TROJANS AFTER INFECTION

Average Viremia in Trojans



Average Virus Excretion (Nasal and Fecal) in Trojans



LOOD PCR

R Ct VALUES IN BLOOD

CONTROL DIET

0	7	14	19	25	28	35	41
X			-2	4	7	14	21
←	Vaccination →			←	Exposure	→	
N	N	N	N	N	N	N	26.4
N	29.7	N	29.4	28.4	N	N	N
N	N	N	N	N	N	25.1	16.9
N	N	N	N	N	N	21.7	17.9
N	N	N	N	N	N	N	N
N	N	N	N	N	27.6	10.6	D
N	29.6	N	N	N	N	25.5	18.9

SDPP DIET

DPV	0	7	14	19	25	28	35
DPEX				-2	4	7	14
Id	←	Vaccination →			←	Exposure	→
376	N	N	N	N	N	N	N
382	N	N	N	N	N	N	N
385	N	N	N	N	N	N	N
388	N	N	N	N	N	N	N
391	N	N	N	26.67	E to balance gr		
394	N	N	N	N	N	N	N
397	N	N	N	N	N	N	N
412	N	N	N	N	N	N	N

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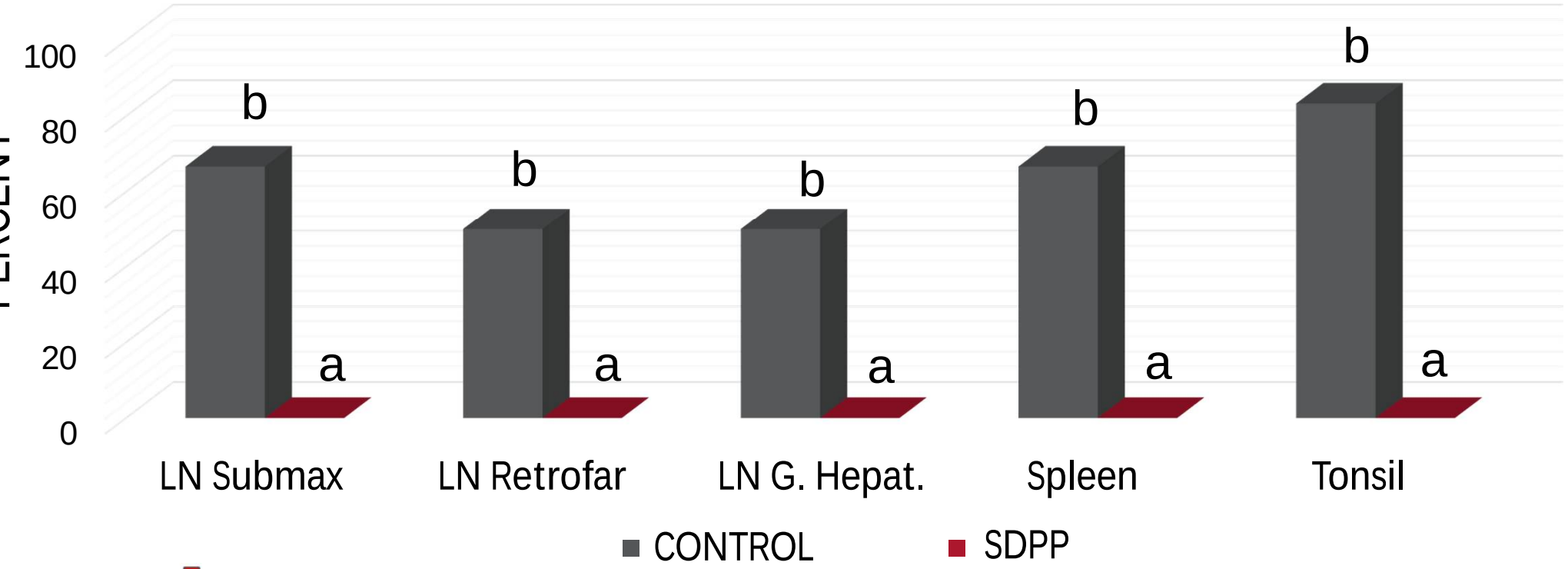
*Ct>30 considered n

PERCENTAGE OF PIGS PCR POSITIVE FOR VARIOUS TISSUES DURING EXPOSURE PERIOD

ALL PIGS FED SDPP HAD NEGATIVE TISSUE PCR

PERCENT POSITIVE PIGS



ab = P

Pujols et al., 2023 Vaccines

VERALL IMPLICATIONS

RAY DRIED PLASMA PROTEIN

Supports better animal health under pathogen challenge

- Reduced viral loads and improved survival

Beneficially modulates immune system response to pathogen challenge

Can improve vaccine protection/efficacy

Has future applications in life-cycle swine production as a health management tool.

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