



Spray dried porcine plasma (SDPP) improves piglets' performance and gut barrier function in the first week post-weaning

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Content



INTRODUCTION



OBJECTIVE



METHODS



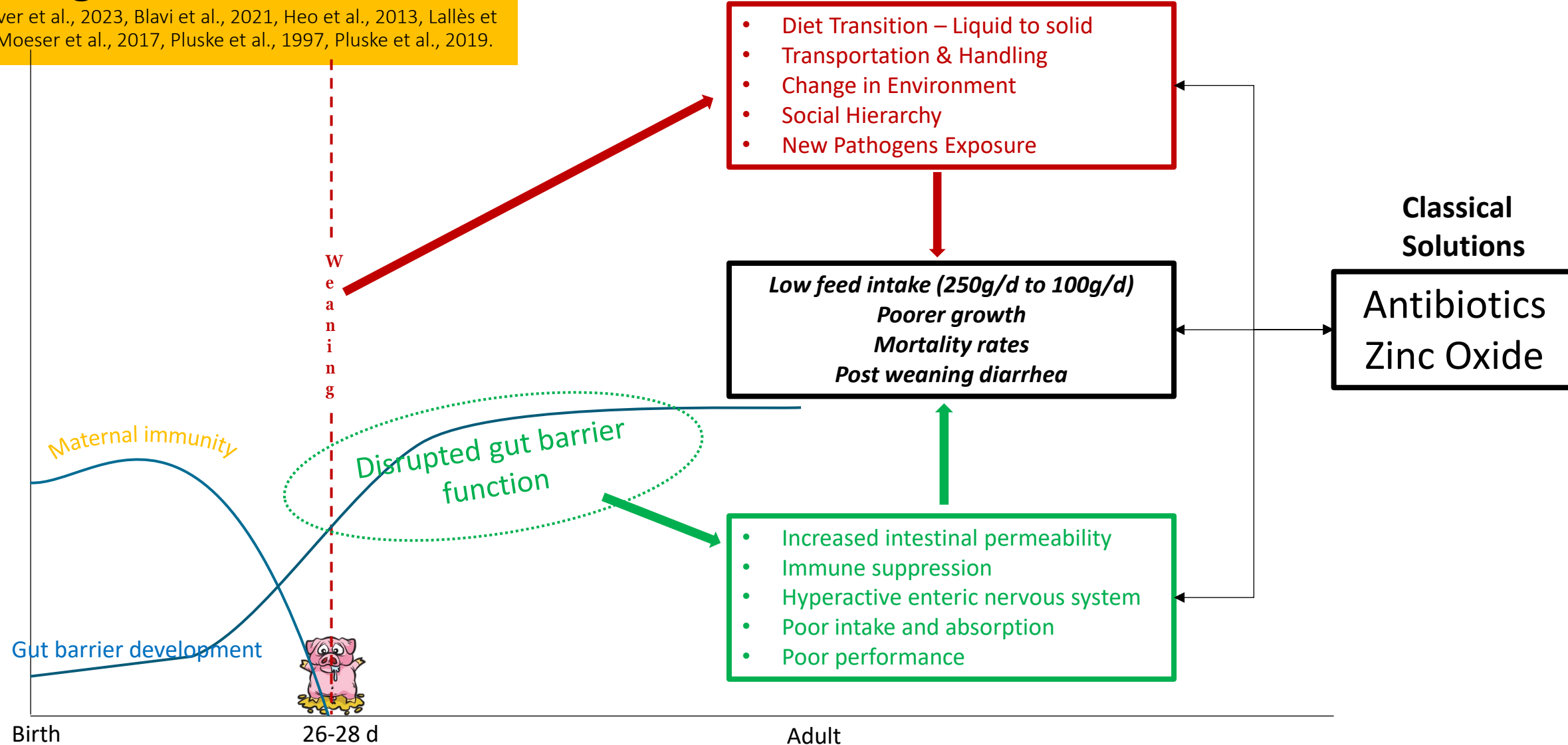
RESULTS



CONCLUSION

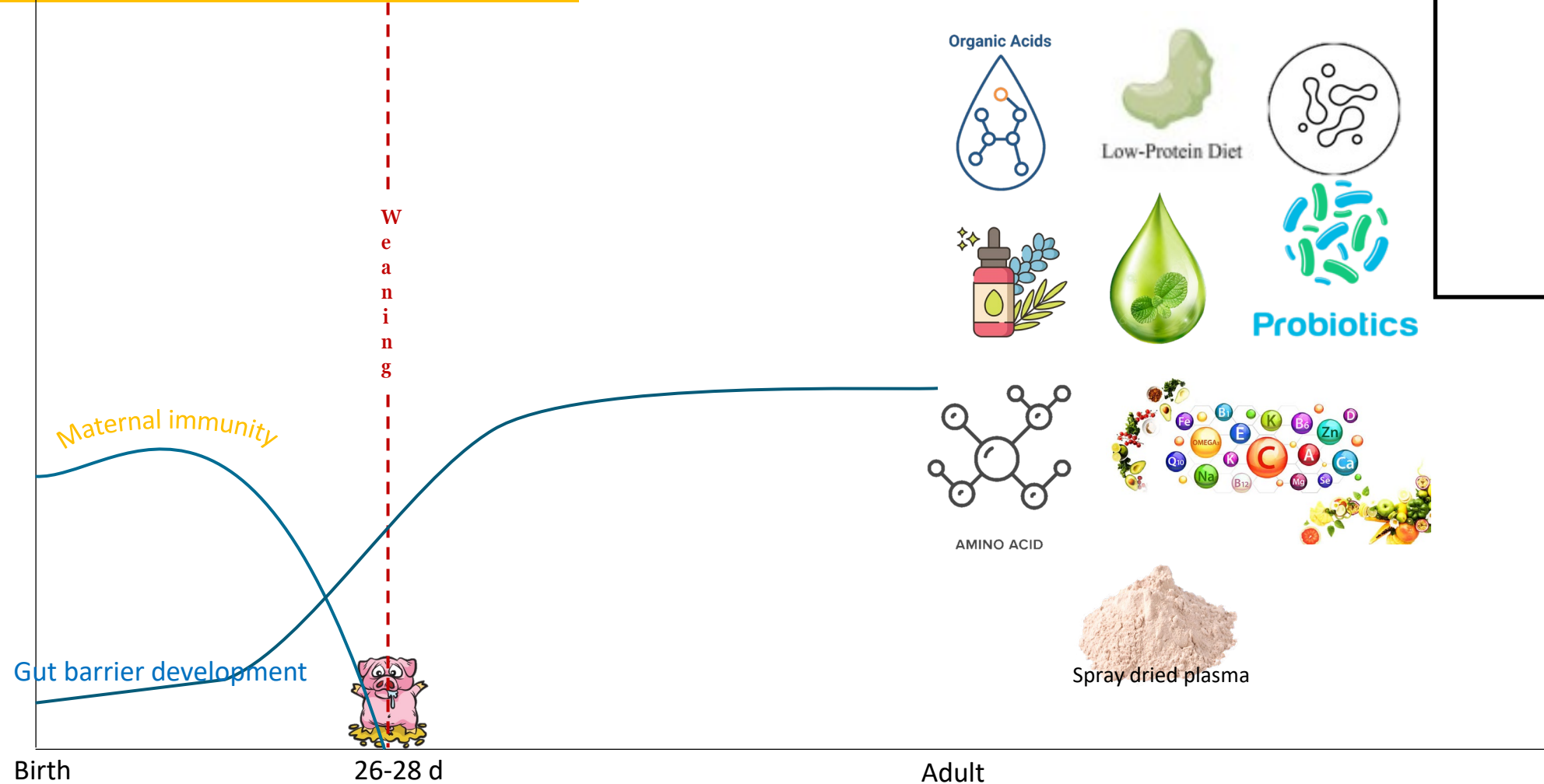
Weaning stress

V. Kerschaver et al., 2023, Blavi et al., 2021, Heo et al., 2013, Lallès et al., 2007, Moeser et al., 2017, Pluske et al., 1997, Pluske et al., 2019.



Alternatives

Luise, D et al., 2020, Canibe et al., 2022, O'Doherty et al., 2024, Papadomichelakis, G et al., 2023, Suiyanrayna and Ramana 2015, Tan et al., 2015, Barba-Vidal et al., 2017, Pejsak et al., 2023.



Alternative Solutions

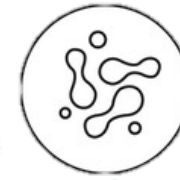
Organic Acids



Low-Protein Diet



Probiotics



AMINO ACID



Spray dried plasma

Classical Solutions

Antibiotics
Zinc Oxide

SDPP

Pérez-Bosque et al., 2016, Castelo et al., 2023, Balan et al., 2021, Torrallardona 2010.

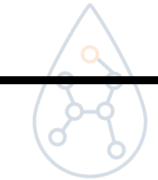
Spray dried porcine plasma

immunoglobulins/antibodies
Palatable

Feed intake↑
Antimicrobial protection↑
Inflammatory processes↓
Digestive/absorptive genes↑
Intestinal development↑

Alternative Solutions

Organic Acids



AMINO ACID



Low-Protein Diet



Probiotics



Spray dried plasma



Probiotics



Probiotics



Probiotics

Classical
Solutions

Antibiotics
Zinc Oxide

Maternal immunity
Gut barrier development

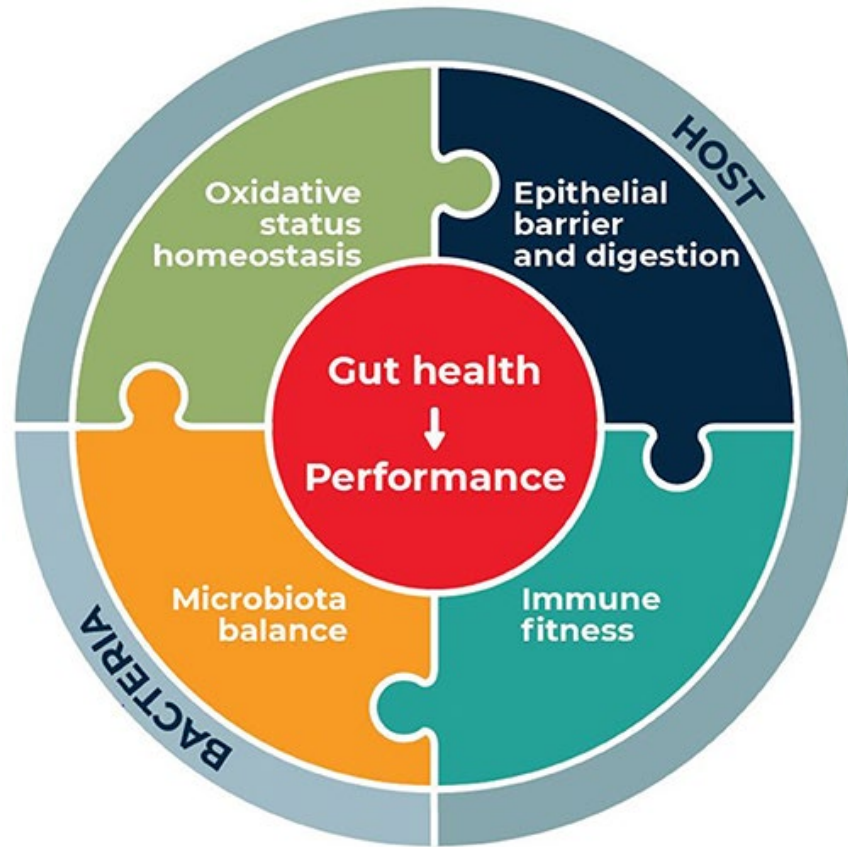
Weaning

Enhanced gut
barrier function↑

Birth

26-28 d

Adult

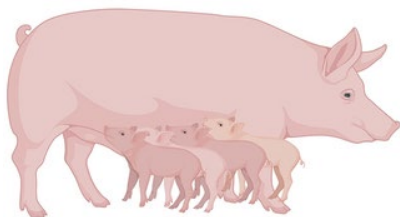


To evaluate the efficacy of spray dried porcine plasma to improve the performance of weaned piglets by enhancing gut barrier function.

Chalvon-Demersay et al., 2021

90 piglets, 9 blocks
2 pens per block
2 treatments: SDPP + Ctrl
5 piglets per pen

W
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a
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Lactation

0d

Pre-starter: SDPP (50 g /kg) or Control (Soy Protein – 62 g/kg)

7d

Body weight
Feed intake
Faecal scores

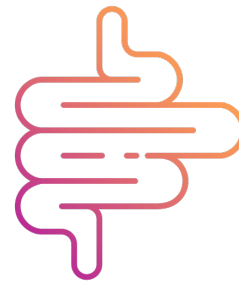
14d

Body weight
Feed intake
Faecal scores

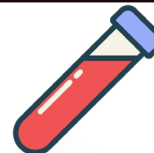
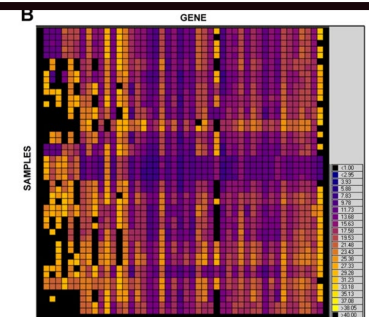
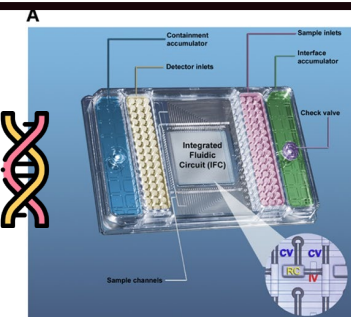
Common starter diet

35d

Body weight
Feed intake
Faecal scores



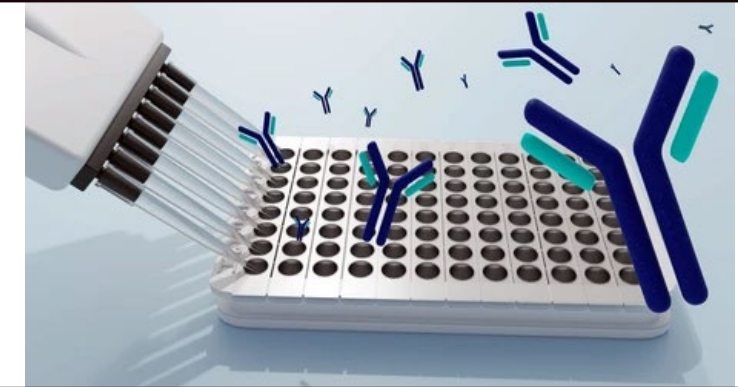
Fluidigm
Gene Expression
(Ileum, Caecum, Jejunum)
48 genes



Calprotectin
Citrulline



Secretory IgA



FLUIDIGM

High throughput RT-qPCR performed in a 96.96 microfluidic dynamic array IFC chip in a BioMark HD System.

A list of 48 genes involved in:

Barrier function *e.g.*, *OCN*, *ZO1*, *CLDN1*, *MUC1*

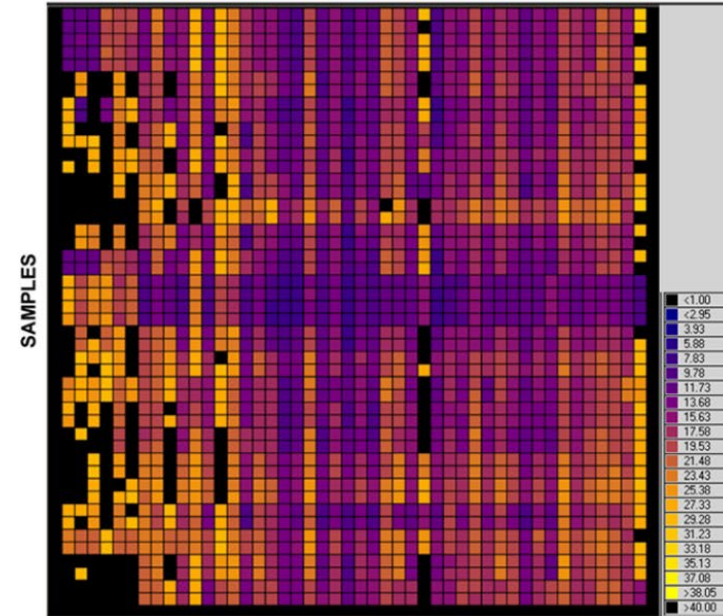
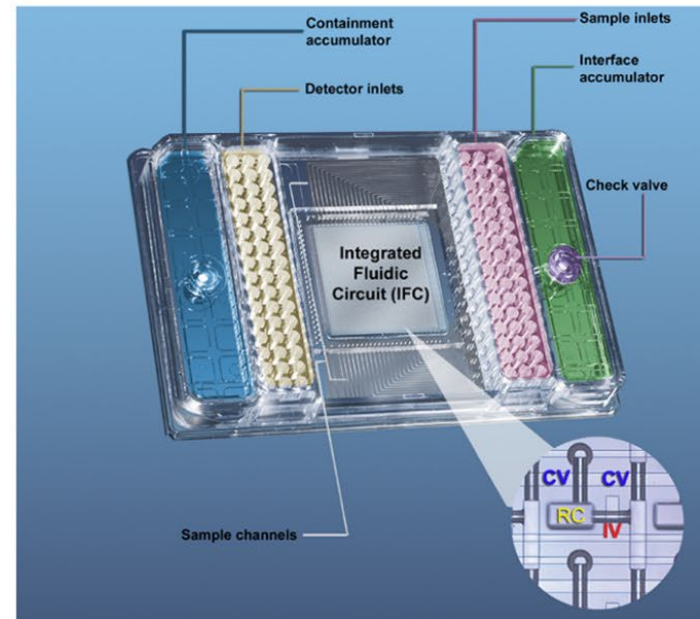
Immune response *e.g.*, *IL-1 α* , *IL8*, *TLR2*, *IFNG*, *TGFB1*, *Reg-3 γ*

Enzymes & hormones in digestion *e.g.*, *PYY*, *GCG*, *SOD2*, *GPX2*, *CCK*

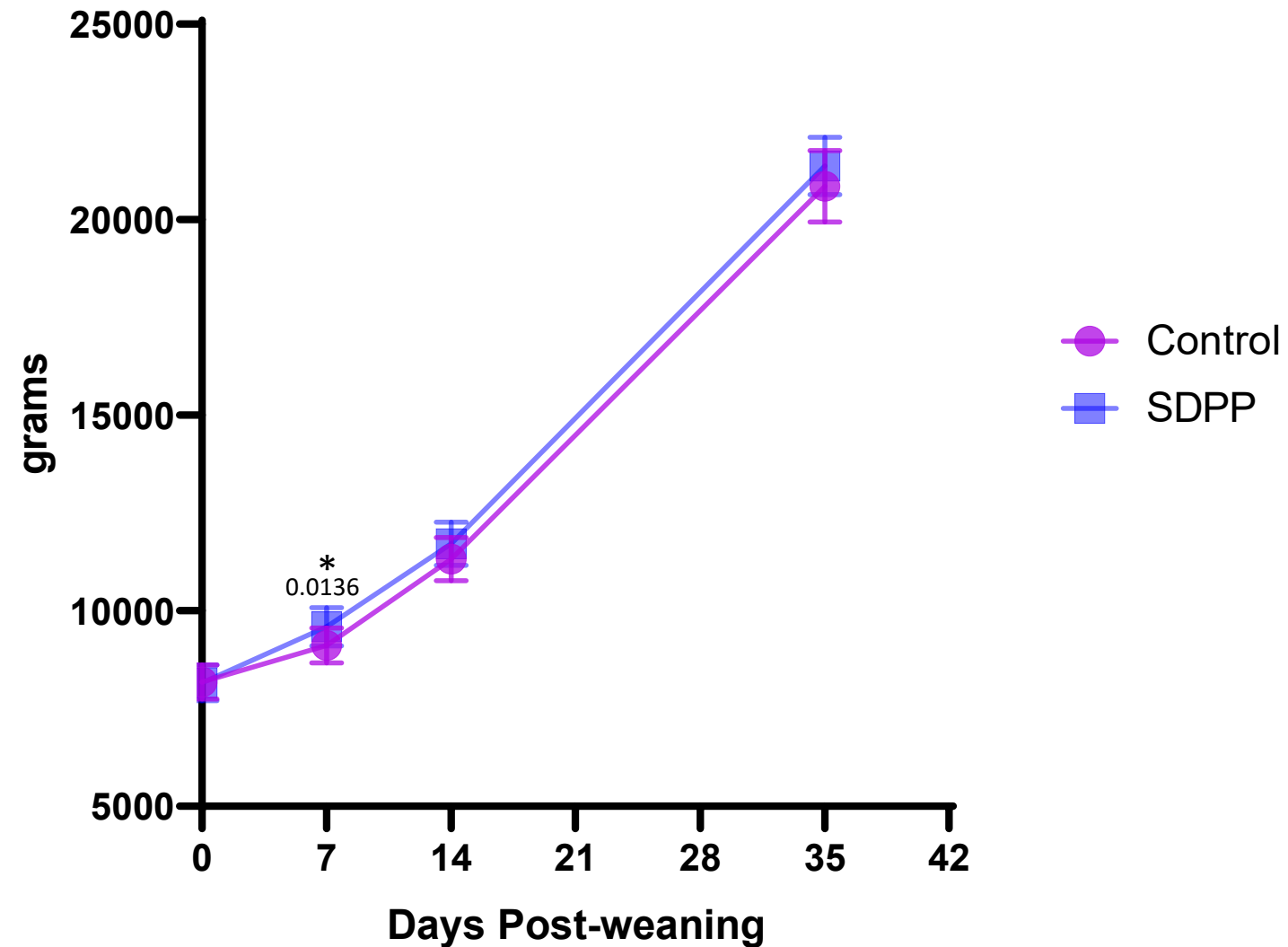
Nutrient transport *e.g.*, *SLC1A1*, *GLUT5*, *SGLT1*, *PEPT1*

Stress response *e.g.*, *CRHR1*, *NR3C1*, *HSD11B1*

Reference genes *e.g.*, *GAPDH*, *ACTB*, *B2M*, *TBP*

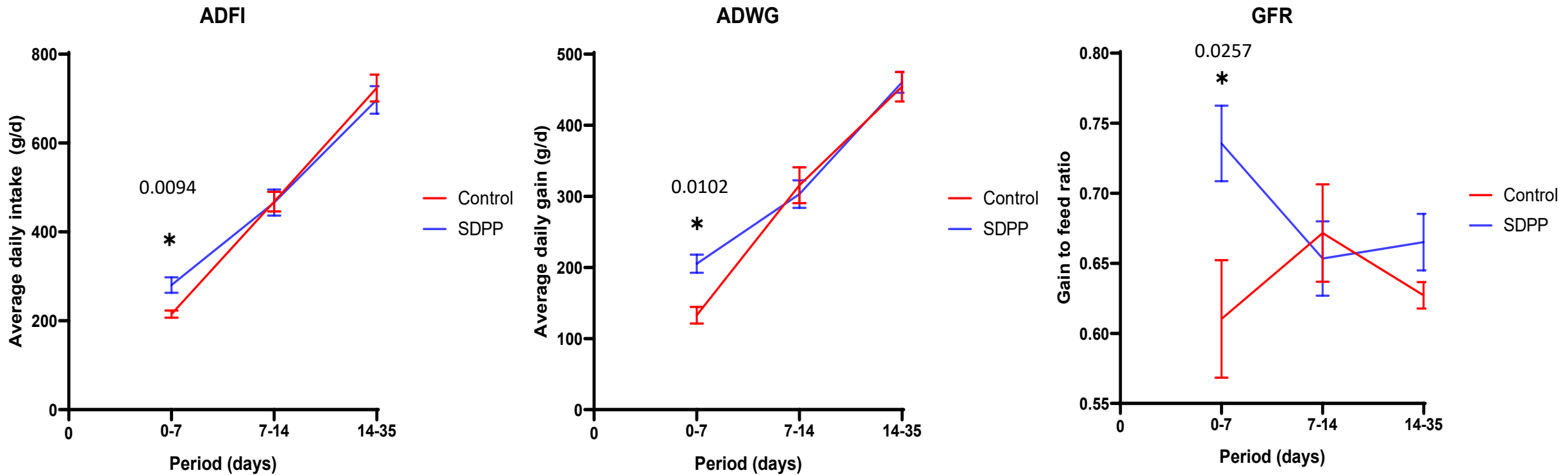


Average body weights per treatment post-weaning



Performance of the three post-weaning trial periods

ADFI; Average daily feed intake, ADWG; Average daily weight gain, GFR; Gain to feed ratio

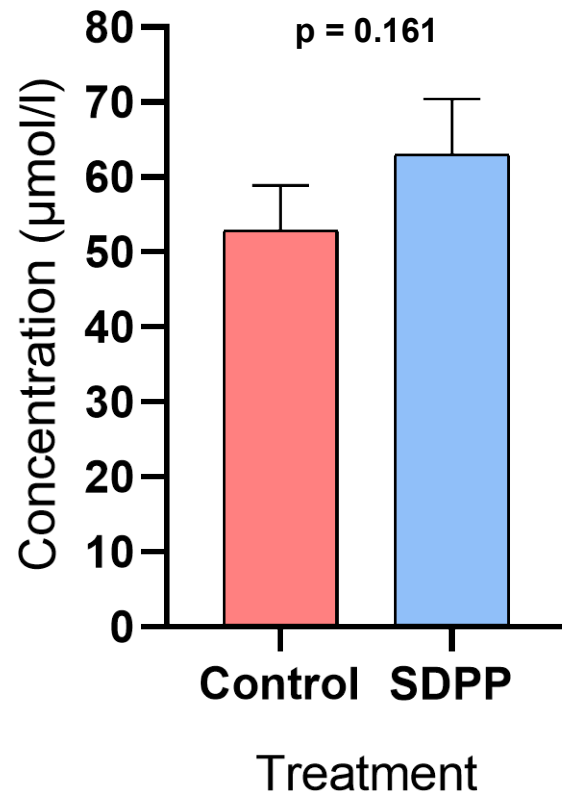


Biomarkers measured by ELISA (piglets 7d post-weaning)

Statistics done by SAS Proc GLM (Error tail bar indicates SD)

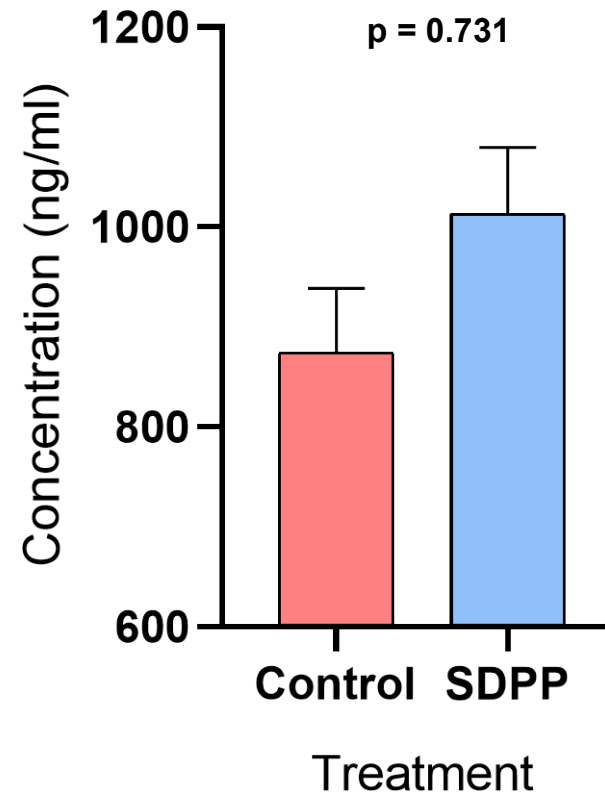
Permeability

Citrulline (serum)



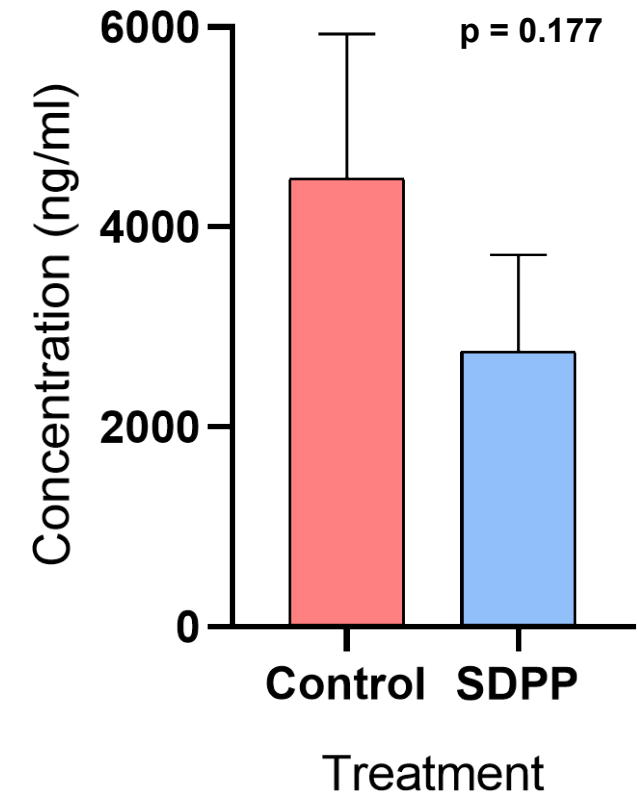
Inflammation

Calprotectin (serum)



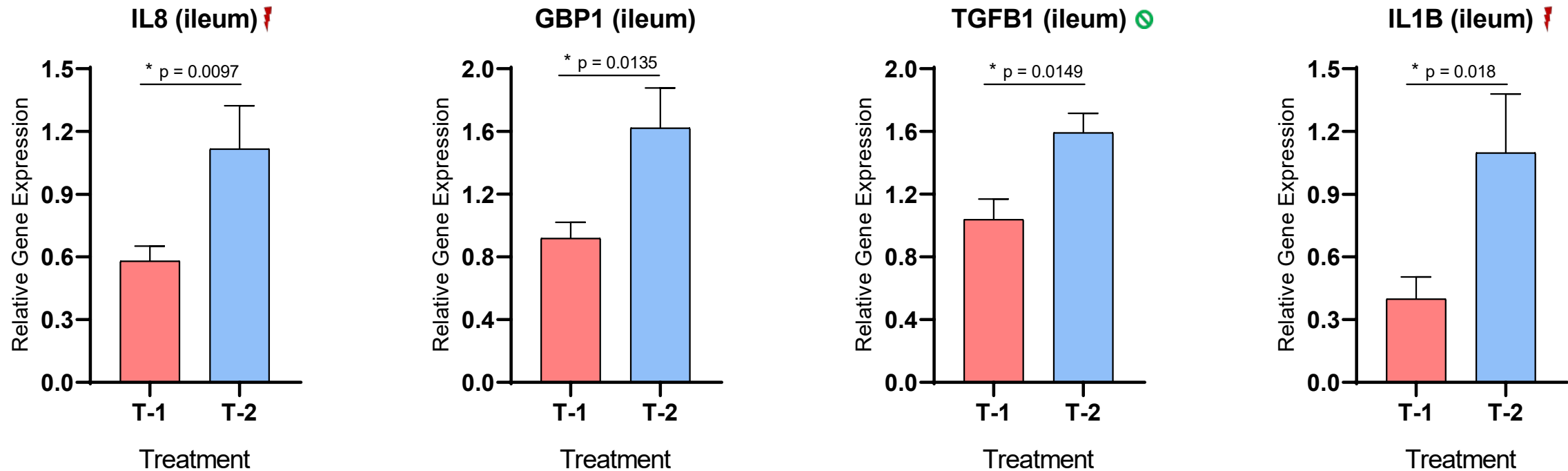
Mucosal unspecific defense

sIgA (bile)



Effect of the experimental treatments on relative gene expression on intestinal mucosa on d7 post weaning.

Analyzed using the glimmix test (SAS)



Genes: IL8: interleukin 8; GBP1: Guanylate-binding protein 1; TGFB1: transforming growth factor beta 1; IL1B: Interleukin 1 Beta.

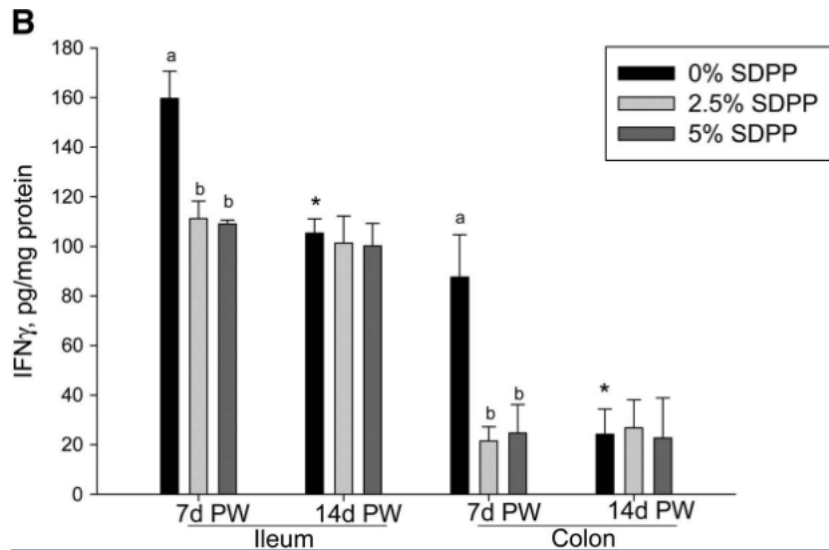
T-1: Control Treatment; T-2: SDPP Treatment

🔪 Pro-inflammatory 🟢 Anti-inflammatory

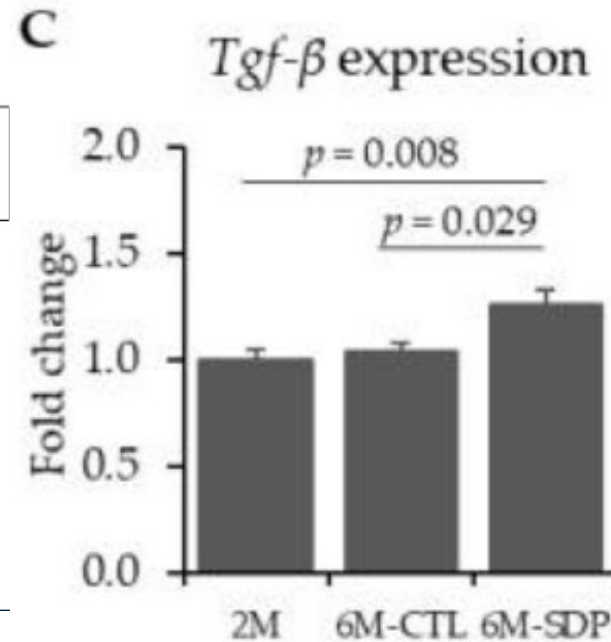
SDP modulates the magnitude of inflammatory responses

To restore mucosal homeostasis and support anti-inflammatory effects

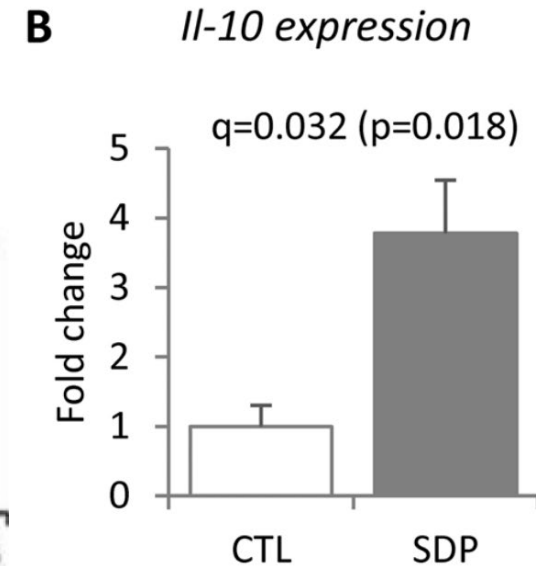
SDP increases the secretion of pro-inflammatory cytokines or anti-inflammatory cytokines?
(Pérez-Bosque et al 2010, Maijó et al 2012, Song et al 2015, Moreto et al 2009, Liu et al 2018)



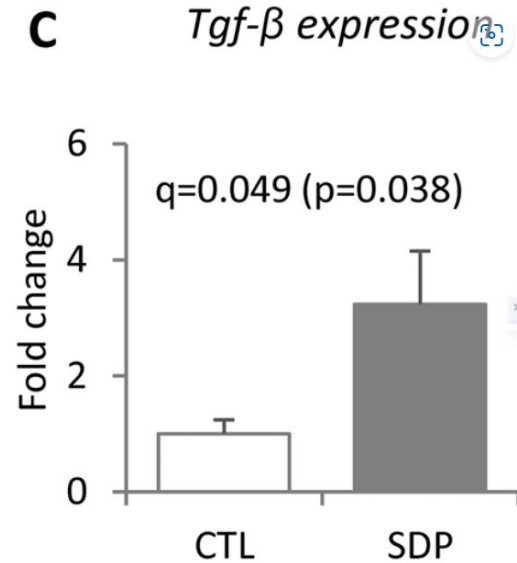
Peace et al 2011

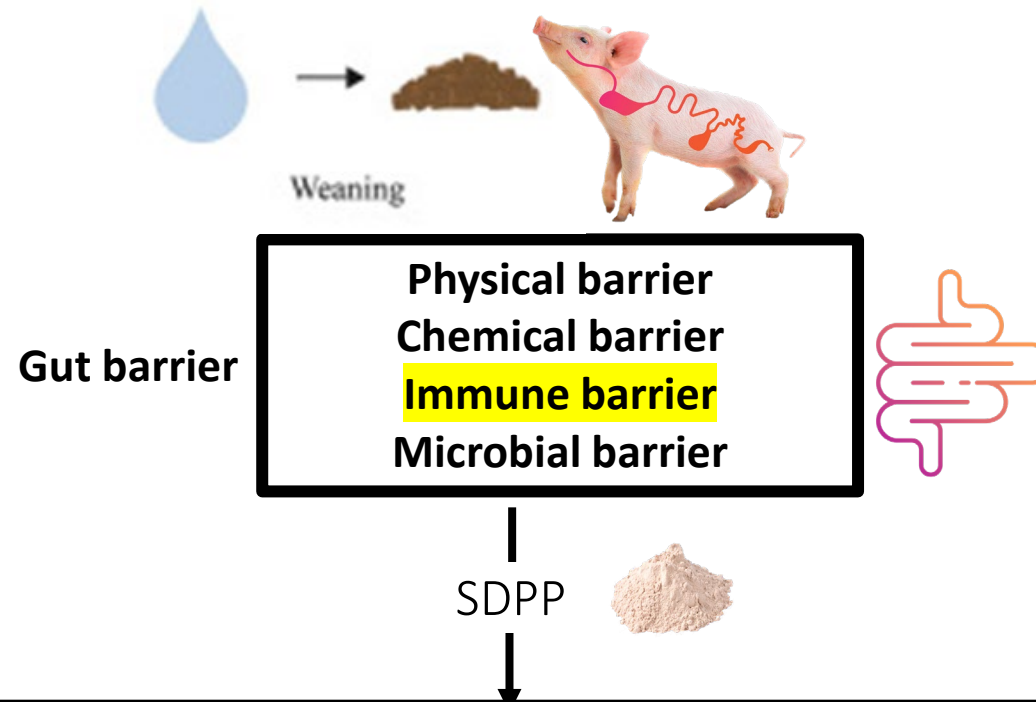


C. Rosell-Cardona et al 2021



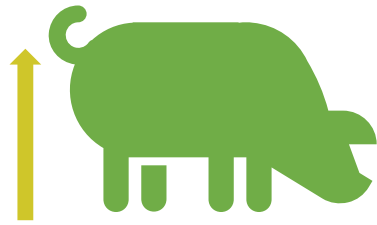
Moretó et al 2020





SDPP increased the expression of IL1b, IL8, GBP1, and TGFb without an active inflammatory process induced by an external injury in healthy piglets. A putative mode of action of SDPP could be based on a direct effect on gut immune system without a pathogenic antigen injury, promoting a preventive activation immune system (reinforcing the adaptive response), increasing the mucus secretion, and promoting the epithelium repair capacity.





The use of SDPP during the pre-starter phase improves piglet's performance, particularly during the first week post-weaning.



SDPP modulates the ileal expression of genes involved in intestinal immune response 7d post-weaning.

Thank you!



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